Medical College Admission Test (MCAT) Practice Exam (Sample)

Study Guide

BY EXAMZIFY

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. Don't worry about getting everything right, 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, and take breaks to retain information better.

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.

7. Use Other Tools

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. How do resistors in parallel compare to capacitors in series?

A. They act in the same way

B. They act oppositely

C. They have no relationship

D. They increase total resistance

2. What concept describes the change in perception relative to the original stimulus?

A. Threshold principle

B. Just noticeable difference

C. Adaptive response

D. Signal detection theory

3. How does a higher temperature affect the pH of a solution?

A. It decreases the pH and increases pOH

B. It increases the Kw, which lowers the pH and pOH

C. It has no effect on pH

D. It increases both pH and pOH

4. When the second resistor is removed from the series circuit, what happens to the voltage drop and current through the first resistor?

A. They both decrease

B. They both remain constant

C. They both increase

D. They fluctuate

5. What determines the limits of the voltage in a circuit?

A. The capacitors

B. The resistors

C. Only the battery

D. Both battery and capacitors

6. When is LH concentration highest in the menstrual cycle?

A. During menstruation

B. Just before ovulation

C. After ovulation

D. During follicular phase

7. In a parallel resistor circuit, what effect does adding a resistor have on the total current supplied by the battery?

A. It remains unchanged

B. It decreases the total current

C. It increases the total current

D. It fluctuates unpredictably

8. Which hormone passes through the cell membrane and mitochondrial membrane to exert some of its influence on metabolism?

A. Cortisol

B. Insulin

C. Thyroid Hormone

D. Growth hormone

9. In a system where torque equals zero, what can be concluded about acceleration?

A. Acceleration is increasing

B. Acceleration is decreasing

C. Acceleration remains constant

D. Acceleration is zero

10. What term describes a situation where males and females exhibit significant physical differences?

A. Low sexual dimorphism

B. High sexual dimorphism

C. Sexual differentiation

D. Gender bias

Answers

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

Explanations

1. How do resistors in parallel compare to capacitors in series?

A. They act in the same way

B. They act oppositely

C. They have no relationship

D. They increase total resistance

Resistors in parallel and capacitors in series exhibit similar behaviors in terms of their overall effects on the total current or voltage in an electrical circuit. In a parallel circuit, the total resistance decreases as more resistors are added. This is because each resistor provides an alternative pathway for current flow. The overall effect is that the total resistance can be calculated using the formula: 1/R_total = 1/R1 + 1/R2 + 1/R3 + ... This results in a lower equivalent resistance than any individual resistor in the circuit. Conversely, when capacitors are connected in series, the total capacitance also decreases with the addition of more capacitors. This is due to the fact that the charge stored by each capacitor is the same, but the voltage across each capacitor adds up, leading to a situation in which the total capacitance can be found using: 1/C_total = 1/C1 + 1/C2 + 1/C3 + ... As a result, the total capacitance in series is lower than that of any individual capacitor. Thus, while resistors in parallel reduce total resistance, capacitors in series reduce total capacitance. Despite this opposite behavior regarding resistance and capacitance, the analogy lies in how both

2. What concept describes the change in perception relative to the original stimulus?

A. Threshold principle

B. Just noticeable difference

C. Adaptive response

D. Signal detection theory

The concept that describes the change in perception relative to the original stimulus is known as the Just Noticeable Difference (JND). This principle is grounded in psychophysics—the study of how physical stimuli are translated into psychological perceptions. Just Noticeable Difference quantifies the smallest amount by which a stimulus can change and still be perceived as different. For instance, if you have a weight of 100 grams, the JND might be 2 grams, meaning you would only notice a difference if the weight changed to 102 grams or more. This concept illustrates how our perception of stimuli is based not just on the stimuli themselves, but also on their relation to a baseline. Thus, JND explains the human ability to perceive changes in stimuli in a relative manner, which is crucial for understanding sensory processing and perception. Other concepts mentioned, such as the threshold principle, adaptive response, and signal detection theory, deal with different aspects of perception, such as the minimum level of stimulus needed for detection, how organisms adapt to consistent stimuli, and distinguishing between signal and noise in perception. However, the focus of relative changes in perception squarely rests with the Just Noticeable Difference.

3. How does a higher temperature affect the pH of a solution?

A. It decreases the pH and increases pOH

B. It increases the Kw, which lowers the pH and pOH

C. It has no effect on pH

D. It increases both pH and pOH

When the temperature of a solution increases, the ion product of water, denoted as Kw, also increases. This is because the dissociation of water into hydrogen ions (H^+) and hydroxide ions (OH^-) is an endothermic process. As the temperature rises, more water molecules have the energy required to break apart, resulting in a greater concentration of both H^+ and OH^- ions. As Kw increases with temperature, the concentrations of H^+ and OH^- ions in pure water will also increase. However, the pH is defined as the negative logarithm of the concentration of H^+ ions; thus, an increase in H^+ ion concentration at a higher temperature will lead to a decrease in pH. Since pOH is also related to the concentration of hydroxide ions (OH^-) and is connected to Kw through the relationship pH + pOH = 14 (under standard temperature conditions), an increase in Kw results in a lower pOH as well. Therefore, the rise in Kw contributes to a decrease in both pH and pOH values as the temperature increases. This relationship highlights how temperature directly influences the behavior of ion concentrations in an aqueous solution, altering both p

4. When the second resistor is removed from the series circuit, what happens to the voltage drop and current through the first resistor?

A. They both decrease

B. They both remain constant

C. They both increase

D. They fluctuate

In a series circuit, the total voltage across the circuit is distributed among the resistors based on their resistances. When the second resistor is removed from the series circuit, the total resistance of the circuit decreases. According to Ohm's Law, which states that current (I) is equal to voltage (V) divided by resistance (R) (I = V/R), a decrease in the total resistance leads to an increase in current flowing through the circuit, assuming the voltage source remains the same. With respect to the voltage drop across the first resistor, since the total current in the circuit has increased due to the lower resistance, the voltage drop across the first resistor is given by the formula V = I * R. As the current increases and the resistance of the first resistor remains constant, the voltage drop across that resistor will also increase. Therefore, when the second resistor is removed, both the current through the first resistor increases due to the decreased total resistance, and the voltage drop across the first resistor increases as well, reflecting the increase in current flowing through it.

5. What determines the limits of the voltage in a circuit?

A. The capacitors

B. The resistors

C. Only the battery

D. Both battery and capacitors

The limits of the voltage in a circuit are primarily determined by the battery. A battery provides a fixed voltage output that sets the maximum potential difference across components connected in the circuit. The voltage supplied by the battery dictates how much electrical energy is available to be converted into other forms of energy, such as light, heat, or motion, when current flows through the circuit. While capacitors can influence voltage in a circuit—by storing charge and affecting the voltage across other components during charging and discharging—they do not set the inherent limit of the circuit's voltage. Resistors, on the other hand, modify the current flow based on voltage but are also not responsible for setting the maximum voltage limit. Therefore, the battery is the primary determinant of voltage levels in electrical circuits.

6. When is LH concentration highest in the menstrual cycle?

A. During menstruation

B. Just before ovulation

C. After ovulation

D. During follicular phase

Luteinizing hormone (LH) plays a crucial role in the menstrual cycle, particularly in ovulation. Its concentration is highest just before ovulation, which is known as the LH surge. This surge is triggered by rising levels of estrogen that occur as the follicles mature during the follicular phase of the cycle. As estrogen levels peak, they exert positive feedback on the anterior pituitary gland, leading to a significant increase in the secretion of LH. This spike in LH signals the ovary to release the mature egg, which is the key event in ovulation. Following this surge, LH levels drop, and they are lower during menstruation and the follicular phase. After ovulation, while LH levels do rise again, they do not reach the peak levels observed just before ovulation. This understanding of the hormonal dynamics is critical for grasping reproductive cycles and is fundamental for topics related to endocrinology in the MCAT.

7. In a parallel resistor circuit, what effect does adding a resistor have on the total current supplied by the battery?

A. It remains unchanged

B. It decreases the total current

C. It increases the total current

D. It fluctuates unpredictably

In a parallel resistor circuit, adding an additional resistor decreases the overall resistance of the circuit, which has a direct effect on the total current supplied by the battery. According to Ohm's Law, the total current (I) flowing through the circuit is equal to the voltage (V) of the battery divided by the total resistance (R) of the circuit, expressed as I = V/R. When a resistor is added in parallel, it provides an additional path for current to flow. The overall equivalent resistance of the circuit is reduced because parallel resistors combine in such a way that their total resistance is always less than the smallest resistor in the group. As resistance decreases while the voltage remains constant, the total current supplied by the battery increases. This principle illustrates how the configuration of resistors in a circuit can directly influence the current, emphasizing the importance of understanding circuit behavior when altering components within it.

8. Which hormone passes through the cell membrane and mitochondrial membrane to exert some of its influence on metabolism?

A. Cortisol

B. Insulin

C. Thyroid Hormone

D. Growth hormone

The correct choice is thyroid hormone, which is known for its ability to pass through both the cell membrane and the mitochondrial membrane to exert its effects on metabolism. Unlike many other hormones, thyroid hormone is lipophilic, allowing it to easily diffuse through lipid membranes without needing a transport mechanism. Once inside the cell, thyroid hormone interacts with nuclear receptors to regulate gene expression, ultimately influencing metabolic processes such as glycolysis, gluconeogenesis, and fat oxidation. This direct impact on mitochondrial function also enhances ATP production, thereby increasing overall metabolic activity. In contrast, hormones like insulin and growth hormone primarily act through membrane-bound receptors, triggering signaling pathways that do not require passage through the membrane. Insulin, for instance, predominantly influences metabolism through its effect on glucose uptake and metabolic pathways via cell surface receptors. Similarly, growth hormone exerts its effects on growth and metabolism through a different signaling mechanism that does not involve crossing into mitochondria.

9. In a system where torque equals zero, what can be concluded about acceleration?

A. Acceleration is increasing

B. Acceleration is decreasing

C. Acceleration remains constant

D. Acceleration is zero

In a system where torque equals zero, it indicates that there is no net rotational force acting on the object. According to Newton's laws, particularly the second law of motion, if an object is not experiencing a net force, then its state of motion will not change. This means that if the object was initially at rest, it will remain at rest, and if it was moving at a constant velocity, it will continue to do so. When analyzing rotational motion, torque is crucial for understanding how an object's angular velocity changes over time. If the torque is zero, there is no angular acceleration influencing the system. Consequently, a state of zero torque implies that the angular acceleration must also be zero, which indicates that any angular velocity remains constant, leading to the conclusion that the acceleration is zero. Therefore, the conclusion that can be drawn regarding acceleration in a system with zero torque is that the acceleration must be zero. This satisfies the conditions for both translational motion (if applicable) and rotational motion, based on the laws of physics governing motion and force.

10. What term describes a situation where males and females exhibit significant physical differences?

A. Low sexual dimorphism

B. High sexual dimorphism

C. Sexual differentiation

D. Gender bias

The term that accurately describes a situation where males and females exhibit significant physical differences is high sexual dimorphism. This concept refers to the observable differences in morphology, size, coloration, or other traits between the sexes of a species. In species exhibiting high sexual dimorphism, these differences can be striking, leading to distinct roles in reproduction or behavior, which can be beneficial for survival and mate selection. For instance, in birds, males may have bright plumage to attract females, while females may have more subdued colors for camouflage. This contrast illustrates high sexual dimorphism, highlighting the pronounced differences between the sexes. Understanding this concept is essential in fields like evolutionary biology and ecology, as it provides insights into mating strategies, role specialization, and species adaptation. Low sexual dimorphism, on the other hand, indicates that males and females are quite similar in physical appearance. Sexual differentiation relates to the process by which individuals develop into male or female phenotypes but does not inherently address the degree of physical difference. Gender bias pertains to social and cultural dimensions rather than biological ones.

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://medicalcollegeadmissiontest.examzify.com

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