# 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. 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. **Blood and arteries, as well as certain parasites, are derived from which layer of germ tissue?**

   **A. Ectoderm**

   **B. Mesoderm**

   **C. Endoderm**

   **D. Neuroectoderm**

2. **What effect do enzymes have on the thermodynamics of a reaction?**

   **A. They increase the reaction rate significantly**

   **B. They decrease the reaction rate**

   **C. They do not affect the thermodynamics of the reaction**

   **D. They increase the activation energy of the reaction**

3. **What is the relationship between torque, moment arm, and force?**

   **A. Torque is the product of moment arm and force**

   **B. Torque is only dependent on moment arm**

   **C. Torque is independent of force**

   **D. Torque is the sum of moment arm and force**

4. **How is an isobaric process represented in a pressure vs. volume graph?**

   **A. Curved line**

   **B. Straight vertical line**

   **C. Horizontal line**

   **D. Sloped line upwards**

5. **What does a small circle notation in delta G signify?**

   **A. It represents the change in free energy**

   **B. It indicates equilibrium conditions**

   **C. It indicates free energy of formation of products minus reactants**

   **D. It symbolizes standard conditions**

**6. What type of breathing is characterized by the involvement of external intercostal muscles?**

- **A. Forced expiration**
- **B. Resting inhalation**
- **C. Active exhalation**
- **D. Passive respiration**

**7. What is a false alarm in the context of memory?**

- **A. Recognizing things that were never presented**
- **B. Correctly recalling past events**
- **C. Confusing similar experiences**
- **D. Remembering details with high accuracy**

**8. How is electronegativity best defined?**

- **A. The ability of an atom to attract electrons in a covalent bond**
- **B. The total number of electrons an atom possesses**
- **C. The ability of an atom to lose electrons easily**
- **D. The amount of energy required to remove an electron**

**9. Which factor contributes to the negative pressure within the thoracic cavity during breathing?**

- **A. Muscle relaxation**
- **B. Fluid in the pleural space**
- **C. Contraction of the diaphragm**
- **D. Air intake from the mouth**

**10. In a parallel circuit, what is the expected effect on the total resistance if all resistors are of equal value and one is removed?**

- **A. Total resistance will increase**
- **B. Total resistance will decrease**
- **C. Total resistance will remain the same**
- **D. Total resistance will become infinite**

# Answers

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

# Explanations

## 1. Blood and arteries, as well as certain parasites, are derived from which layer of germ tissue?

**A. Ectoderm**

**B. Mesoderm**

**C. Endoderm**

**D. Neuroectoderm**

**The correct answer is indeed mesoderm. The mesoderm is one of the three primary germ layers formed during embryonic development, the others being ectoderm and endoderm. It plays a crucial role in the formation of various tissues and organ systems in the body. Blood and components of the cardiovascular system, including arteries, originate from the mesoderm. This layer gives rise to not only the circulatory system but also the muscles, bones, and connective tissues. The development of blood cells occurs in the mesodermal layer through a process called hematopoiesis, which takes place in structures like the yolk sac in early development and later in the bone marrow. Certain parasites, particularly those that affect humans, may also have lifecycle stages influenced by mesodermal derivatives. For example, some parasitic infections can impact the function and formation of blood cells, highlighting the connection between mesodermal development and parasitic pathology. In contrast, the ectoderm is primarily responsible for forming the outer structures of the body, such as skin and the nervous system. The endoderm forms the internal organs like the digestive tract and respiratory system, and the neuroectoderm is a specific part of the ectoderm that**

## 2. What effect do enzymes have on the thermodynamics of a reaction?

**A. They increase the reaction rate significantly**

**B. They decrease the reaction rate**

**C. They do not affect the thermodynamics of the reaction**

**D. They increase the activation energy of the reaction**

**Enzymes are biological catalysts that speed up chemical reactions without being consumed in the process. While they significantly enhance the rate of a reaction by lowering the activation energy, they do not affect the overall thermodynamics. Thermodynamics refers to the energy changes and equilibrium of a reaction, including the free energy difference between reactants and products. The role of enzymes is to provide an alternative pathway for the reaction with a lower activation energy. This means that while the rate at which equilibrium is reached is affected, the position of equilibrium—the concentration of reactants versus products at equilibrium—remains unchanged. Therefore, enzymes do not influence the free energy change (ΔG) of the reaction. This understanding is fundamental in biochemistry, highlighting that while enzymes can facilitate and accelerate reactions, they do not alter the thermodynamic properties underpinning those reactions.**

## 3. What is the relationship between torque, moment arm, and force?

**A. Torque is the product of moment arm and force**

**B. Torque is only dependent on moment arm**

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**D. Torque is the sum of moment arm and force**

**Torque is defined as the measure of the force that can cause an object to rotate about an axis. The relationship between torque, moment arm, and force is fundamental in rotational mechanics. Specifically, torque is calculated using the formula: Torque = Force x Moment Arm x sin(θ) In scenarios where the force is applied perpendicular to the moment arm (which is common in many applications), the sine of the angle (θ) is equal to 1. Hence, in such cases, the formula simplifies to: Torque = Force x Moment Arm This indicates that torque increases with increased force or with a longer moment arm, which represents the distance from the pivot point to the point where the force is applied. The longer the moment arm, the greater the leverage effect, allowing the same amount of force to produce a larger torque. The other options suggest misunderstandings about the concepts involved. Saying torque is only dependent on the moment arm overlooks the importance of the force applied. Claiming torque is independent of force is incorrect, as torque cannot exist without it. Lastly, stating that torque is the sum of moment arm and force does not align with the defined relationship between these quantities. Understanding this relationship is key for applications in physics and engineering, such as in the**

## 4. How is an isobaric process represented in a pressure vs. volume graph?

**A. Curved line**

**B. Straight vertical line**

**C. Horizontal line**

**D. Sloped line upwards**

**In a pressure vs. volume graph, an isobaric process is represented by a horizontal line. This is because an isobaric process is characterized by constant pressure throughout the entire process. As the volume changes—whether it is expanding or compressing—the pressure remains the same. On the graph, this translates to a horizontal movement along the volume axis while the pressure measurement does not change, resulting in a line that maintains a constant level on the pressure axis. In contrast, a vertical line would indicate that the volume is not changing while the pressure varies, which does not depict an isobaric process. Similarly, a curved line would suggest that the relationship between pressure and volume is not linear, and a sloped line would represent a change in both pressure and volume, indicating a process where at least one of those parameters varies, which again does not fit the definition of an isobaric process.**

## 5. What does a small circle notation in delta G signify?

**A. It represents the change in free energy**

**B. It indicates equilibrium conditions**

**C. It indicates free energy of formation of products minus reactants**

**D. It symbolizes standard conditions**

**The small circle notation in the context of delta G (ΔG°) is indicative of standard conditions. This notation is commonly used to denote that the change in Gibbs free energy is measured under standard conditions, which typically includes a specific temperature (usually 298 K), a pressure of 1 atm, and concentrations of reactants and products at 1 M. Using this notation facilitates clear communication about experimental conditions and allows for consistent comparisons across different chemical reactions. In thermodynamics, standard free energy changes provide essential insights into the spontaneity of reactions and their equilibrium positions. Recognizing this convention is crucial for interpreting thermodynamic data accurately. Each of the other options pertains to different aspects of thermodynamics but does not specifically relate to what the small circle notation signifies.**

## 6. What type of breathing is characterized by the involvement of external intercostal muscles?

**A. Forced expiration**

**B. Resting inhalation**

**C. Active exhalation**

**D. Passive respiration**

**The involvement of external intercostal muscles is primarily associated with resting inhalation. During this phase of breathing, a person is at rest, and inhalation is typically a controlled and active process. The external intercostal muscles contract to elevate the ribs and expand the chest cavity. This expansion decreases the pressure within the thoracic cavity relative to the atmospheric pressure, allowing air to flow into the lungs. This mechanism is essential for efficient gas exchange, as it increases lung volume and therefore allows for a greater intake of air. In contrast, the other options involve different processes: forced expiration typically requires the use of abdominal muscles for maximum expiration; active exhalation involves muscle contractions rather than the passive return of the diaphragm and intercostal muscles to their original positions; and passive respiration predominantly relies on the natural elasticity of the lung tissue without additional muscle involvement during exhalation. Understanding the role of the external intercostal muscles during resting inhalation helps clarify the mechanics of normal, effortless breathing.**

## 7. What is a false alarm in the context of memory?

**A. Recognizing things that were never presented**

**B. Correctly recalling past events**

**C. Confusing similar experiences**

**D. Remembering details with high accuracy**

**A false alarm in the context of memory refers to the phenomenon where an individual recognizes or believes they remember something that was never actually presented or encountered before. This situation illustrates a failure of memory accuracy, where the brain incorrectly identifies a familiar stimulus. It is significant in understanding how memory works, especially in situations like eyewitness testimonies or recall studies, where the confidence in a memory may not correlate with its actual veracity. False alarms highlight the reconstructive nature of memory, where our recollections can be influenced by various factors, including context, suggestion, and prior knowledge. The other options focus on aspects of memory that are aligned with accurate recall or confusion between similar experiences, rather than the specific error associated with false alarms. Correct recollections and high-accuracy memories indicate successful retrieval of information, while confusion of similar experiences speaks to difficulties in distinguishing between events. False alarms specifically emphasize the errors in memory recognition, which is where the distinct definition lies.**

## 8. How is electronegativity best defined?

**A. The ability of an atom to attract electrons in a covalent bond**

**B. The total number of electrons an atom possesses**

**C. The ability of an atom to lose electrons easily**

**D. The amount of energy required to remove an electron**

**Electronegativity is best defined as the ability of an atom to attract electrons in a covalent bond. This concept is crucial in understanding how different atoms interact with one another during chemical bonding. Electronegativity values can indicate how strongly an atom will pull shared electrons towards itself when bonded to another atom. Higher electronegativity means a greater tendency to attract electrons, which influences the nature of the bonding (whether it is ionic or covalent) and the resulting molecular structure and properties. In contrast, other options present concepts that do not accurately capture the essence of electronegativity. The total number of electrons an atom possesses is a reflection of its atomic number and does not directly determine its ability to attract electrons in covalent interactions. The ability of an atom to lose electrons easily pertains more to electropositivity, which is the opposite concept of electronegativity, indicating that it readily gives up electrons rather than attracting them. Lastly, the amount of energy required to remove an electron refers to ionization energy, a separate property that relates to the strength of an atom's hold on its electrons rather than how it interacts with other atoms in terms of attracting shared electrons in bonds. Understanding electronegativity helps predict bonding behavior and the polarity**

## 9. Which factor contributes to the negative pressure within the thoracic cavity during breathing?

**A. Muscle relaxation**

**B. Fluid in the pleural space**

**C. Contraction of the diaphragm**

**D. Air intake from the mouth**

**The phenomenon of negative pressure within the thoracic cavity during breathing primarily relates to the contraction of the diaphragm. When the diaphragm contracts, it moves downward, increasing the volume of the thoracic cavity. According to Boyle's law, as the volume of a closed space increases, the pressure within that space decreases. This reduction in pressure creates a negative pressure relative to the atmosphere, which facilitates the inflow of air into the lungs. The contraction of the diaphragm is essential for inhalation because it not only increases lung volume but also helps to expand the pleural cavity, thus further decreasing pressure in the thoracic cavity. This negative pressure draws air into the lungs through the airways as air moves from a region of higher pressure (outside the body) to a region of lower pressure (inside the thoracic cavity). In this context, it's clear why this choice is essential to understanding the mechanics of breathing and how airflow into the lungs is facilitated. This effect is crucial for effective ventilation and oxygenation of the blood during respiration.**

## 10. In a parallel circuit, what is the expected effect on the total resistance if all resistors are of equal value and one is removed?

**A. Total resistance will increase**

**B. Total resistance will decrease**

**C. Total resistance will remain the same**

**D. Total resistance will become infinite**

**In a parallel circuit, the total resistance is determined by the reciprocal of the sum of the reciprocals of each individual resistor's resistance. When all resistors are of equal value, the formula for the total resistance becomes: $1/R_{total} = 1/R + 1/R + ... + 1/R$ (for the number of resistors, n). This simplifies to: $R_{total} = R/n$, where R is the resistance of one resistor, and n is the number of resistors. If one resistor is removed from this parallel configuration, the total number of resistors decreases from n to n-1. Therefore, the new total resistance can be computed as: $R_{new\_total} = R/(n-1)$. As the value of n decreases, the denominator (n - 1) becomes smaller, resulting in a larger value for $R_{new\_total}$ compared to $R_{total}$. Hence, the total resistance increases when a resistor is removed from one of all equal value in a parallel circuit. This is because, with fewer pathways for current to flow, the overall ability for the circuit to conduct electricity diminishes, leading to a higher total resistance. Thus, the correct response reflects this understanding of how parallel circuits behave when resistive components are removed.**

# 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!**