BIOLOGICAL SYSTEMS MCAT PRACTICE EXAM (SAMPLE)

STUDY GUIDE



SAMPLE STUDY GUIDE WITH LIMITED QUESTIONS

VISIT US ONLINE FOR THE FULL VERSION STUDY GUIDE

https://biologicalsystemsmcat.examzify.com

Copyright © 2026 by Examzify - A Kaluba Technologies Inc. product.

ALL RIGHTS RESERVED.

No part of this book may be reproduced or transferred in any form or by any means, graphic, electronic, or mechanical, including photocopying, recording, web distribution, taping, or by any information storage retrieval system, without the written permission of the author.

Notice: Examzify makes every reasonable effort to obtain accurate, complete, and timely information about this product from reliable sources.

SAMPLE

Table of Contents

Copyright 1
Table of Contents 2
Introduction 3
How to Use This Guide 4
Questions 5
Answers 8
Explanations 10
Next Steps 15

SAMPLE

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.

SAMPLE

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!

SAMPLE

Questions

SAMPLE

1. What is the role of gap junctions in electrical synapses?

A. Unidirectional flow of impulse

B. Bidirectional flow of impulse

C. Fast axonal transport

D. Neurotransmitter release

2. Which structure is primarily responsible for primitive reflexes and basic behaviors like walking?

A. Cerebellum

B. Spinal cord

C. Hypothalamus

D. Cerebral cortex

3. What is the first stage of embryogenesis called when the zygote undergoes rapid cell division?

A. Blastulation

B. Cleavage

C. Gastrulation

D. Neurulation

4. What analogy correctly matches the testis in males?

A. Penis

B. Ovaries

C. Uterus

D. Vagina

5. Which type of neuron is primarily located in the dorsal root ganglion?

A. Motor neurons

B. Relaying neurons

C. Sensory neurons

D. Interneurons

SAMPLE

6. What effect does an increase in carbon dioxide have on hemoglobin's affinity for oxygen?

A. Increases affinity

B. No effect

C. Decreases affinity

D. Shifts curve to the left

7. What occurs during the luteal phase of the ovarian cycle?

A. The corpus luteum degenerates.

B. The endometrial lining sheds.

C. The corpus luteum secretes estrogen and progesterone.

D. The follicle matures.

8. What is the primary role of the nervous system?

A. Digestion of food

B. Control and integration of other body systems

C. Regulation of hormones

D. Production of red blood cells

9. Which layer of skin contains blood vessels and sensory receptors?

A. Epidermis

B. Dermis

C. Hypodermis

D. Stratum Basale

10. Which of the following is NOT a function of the sympathetic nervous system?

A. Pupil dilation

B. Decreased digestion

C. Increased urinary output

D. Stimulation of adrenal medulla

SAMPLE

Answers

SAMPLE

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

SAMPLE

Explanations

SAMPLE

1. What is the role of gap junctions in electrical synapses?

A. Unidirectional flow of impulse

B. Bidirectional flow of impulse

C. Fast axonal transport

D. Neurotransmitter release

Gap junctions play a crucial role in electrical synapses by allowing the direct passage of ions and small molecules between adjacent cells, facilitating communication. This structure enables a bidirectional flow of impulses because the electrical signals can move freely in both directions across the junction. In contrast, other types of synapses, such as chemical synapses, typically involve neurotransmitter release, which is unidirectional: the signal is initiated in the presynaptic neuron and is received by the postsynaptic neuron after the neurotransmitter is released into the synaptic cleft. The statement regarding fast axonal transport pertains to the movement of materials along the axon but does not involve the rapid electrical communication afforded by gap junctions. Understanding this allows one to appreciate how electrical synapses enable quick, coordinated responses in certain tissues, such as cardiac and some smooth muscle cells, where synchronized contraction is vital. This contrasts with the slower signaling seen in chemical synapses, emphasizing the importance of gap junctions in enabling fast and reliable communication between excitable cells.

2. Which structure is primarily responsible for primitive reflexes and basic behaviors like walking?

A. Cerebellum

B. Spinal cord

C. Hypothalamus

D. Cerebral cortex

The spinal cord plays a crucial role in coordinating primitive reflexes and basic motor behaviors, such as walking. Reflexes are automatic responses to stimuli, and many of these reflexes, including withdrawal reflexes and those involved in locomotion, are mediated directly through the spinal cord. This allows for rapid responses without the need for higher brain processing. In terms of walking, the spinal cord contains networks of neurons known as central pattern generators, which are responsible for generating the rhythmic patterns of movement for walking. Even in the absence of higher brain input, these networks can produce coordinated movements due to their intrinsic properties. Other structures, while they do contribute to motion and behavior, do not directly mediate these primitive reflexes. The cerebellum is primarily involved in the coordination and fine-tuning of movements rather than initiating basic reflexes. The hypothalamus plays key roles in homeostasis and emotional responses but is not directly responsible for motor behaviors. The cerebral cortex is essential for higher-order processing and voluntary control of movements but does not govern the primitive reflexive actions that are largely spinal cord-mediated.

SAMPLE

3. What is the first stage of embryogenesis called when the zygote undergoes rapid cell division?

A. Blastulation

B. Cleavage

C. Gastrulation

D. Neurulation

The first stage of embryogenesis characterized by rapid cell division of the zygote is known as cleavage. During this phase, the single-celled zygote undergoes a series of mitotic divisions, resulting in a multicellular structure called the blastula. These divisions are unique because they increase the number of cells without increasing the overall mass of the embryo, leading to smaller cells known as blastomeres. Cleavage is crucial as it sets the stage for subsequent embryonic development, including the processes of implantation and formation of the embryonic layers. Blastulation occurs after cleavage, when the blastula is formed, while gastrulation follows, marking the differentiation of the embryonic layers. Neurulation is a later step involving the formation of the neural tube and is also well after the cleavage stage. Each of these subsequent stages builds upon the foundation laid by cleavage, emphasizing the importance of this initial phase in the overall development of the embryo.

4. What analogy correctly matches the testis in males?

A. Penis

B. Ovaries

C. Uterus

D. Vagina

The analogy that correctly matches the testis in males is the ovaries in females. Both the testis and the ovaries are gonads, which are the primary reproductive organs in their respective sexes. They are responsible for the production of gametes (sperm in males and eggs in females) and also secrete hormones that are critical for sexual development and reproductive functions. The testis produces testosterone and sperm, while the ovaries produce estrogen, progesterone, and eggs. By comparing the testis to the ovaries, the relationship highlights the analogous roles these organs play in the reproductive systems of males and females, respectively. Thus, the link between the testis and the ovaries is rooted in their functions within the reproductive processes.

5. Which type of neuron is primarily located in the dorsal root ganglion?

A. Motor neurons

B. Relaying neurons

C. Sensory neurons

D. Interneurons

The dorsal root ganglion primarily contains sensory neurons, which are responsible for transmitting sensory information from peripheral sensory receptors to the central nervous system. These neurons have specialized structures, known as dorsal root ganglion cells, which are unipolar and have a single process that splits into two branches: one that connects to sensory receptors and the other that extends into the spinal cord. Sensory neurons play a crucial role in conveying information about stimuli such as pain, temperature, and touch. Their location in the dorsal root ganglion allows for the efficient processing and transmission of sensory input to the brain, making them essential for the functioning of the sensory system. In contrast, motor neurons, which are responsible for sending signals from the CNS to muscles, are located in the ventral horn of the spinal cord, and interneurons, which facilitate communication between neurons, are primarily found in the gray matter of the spinal cord. Relaying neurons, often referring to interneurons or other types specifically involved in processing and passing information, do not specifically represent the primary type found in the dorsal root ganglion.

SAMPLE

6. What effect does an increase in carbon dioxide have on hemoglobin's affinity for oxygen?

A. Increases affinity

B. No effect

C. Decreases affinity

D. Shifts curve to the left

An increase in carbon dioxide concentration decreases hemoglobin's affinity for oxygen. This phenomenon occurs due to the Bohr effect, where increased levels of carbon dioxide and the corresponding drop in pH (due to the formation of carbonic acid) lead to a conformational change in hemoglobin. This change makes it less able to bind oxygen, facilitating the release of oxygen in tissues that are actively metabolizing and producing carbon dioxide. The decrease in affinity ensures that tissues with high levels of carbon dioxide can receive the oxygen they need for aerobic respiration. This understanding is critical because it illustrates the dynamic relationship between carbon dioxide levels and oxygen delivery in the body, highlighting how metabolic activity can influence gas exchange.

7. What occurs during the luteal phase of the ovarian cycle?

A. The corpus luteum degenerates.

B. The endometrial lining sheds.

C. The corpus luteum secretes estrogen and progesterone.

D. The follicle matures.

During the luteal phase of the ovarian cycle, the corpus luteum, which forms from the remnants of the follicle after ovulation, plays a crucial role in preparing the endometrium for potential implantation of an embryo. The corpus luteum secretes both estrogen and progesterone. These hormones are vital for maintaining the thickened state of the endometrial lining, promoting further development and maturation in anticipation of a possible pregnancy. If fertilization does not occur, the corpus luteum eventually degenerates, leading to a drop in these hormone levels, and initiating the subsequent menstrual phase. Therefore, the secretion of estrogen and progesterone during the luteal phase directly supports the changes in the endometrial lining necessary for potential implantation.

8. What is the primary role of the nervous system?

A. Digestion of food

B. Control and integration of other body systems

C. Regulation of hormones

D. Production of red blood cells

The primary role of the nervous system is to control and integrate other body systems. It functions by receiving sensory information from the environment, processing that information, and coordinating responses throughout the body. This includes regulating muscle movements, interpreting sensory inputs such as sight and sound, and facilitating communication between different body regions via neural pathways. The nervous system is essential for maintaining homeostasis, which is the body's internal balance. It achieves this by responding to internal and external stimuli, influencing other systems like the endocrine and muscular systems. By sending messages through electrical impulses, it rapidly coordinates actions and reactions, allowing the organism to adapt to changes efficiently. The other choices pertain to functions that are primarily managed by different systems in the body. Digestion, for example, is mainly managed by the digestive system, while hormonal regulation is primarily the function of the endocrine system. The production of red blood cells occurs in the bone marrow as part of the hematologic system, not the nervous system. Therefore, the correct understanding of the nervous system's role highlights its integration and control functions crucial for organismal survival and interaction with the environment.

SAMPLE

9. Which layer of skin contains blood vessels and sensory receptors?

A. Epidermis

B. Dermis

C. Hypodermis

D. Stratum Basale

The dermis is the layer of skin that contains blood vessels and sensory receptors. This layer lies beneath the epidermis and is essential for providing structural support to the skin. It houses a variety of structures, including connective tissue, hair follicles, sebaceous glands, and sweat glands. The presence of blood vessels in the dermis is critical for thermoregulation and the delivery of nutrients to the skin. Additionally, the sensory receptors located within the dermis allow for the detection of tactile stimuli, temperature changes, and pain, contributing to our sense of touch. On the other hand, the epidermis, which is the outermost layer of skin, does not contain blood vessels or significant nerve endings; it primarily consists of keratinocytes and serves as a protective barrier against environmental damage. The hypodermis, located below the dermis, serves as an insulating layer and connects the skin to underlying tissues but is not considered a part of the skin itself. The stratum basale is a specific layer within the epidermis responsible for generating new skin cells, but it too lacks the vascular and sensory components found in the dermis.

10. Which of the following is NOT a function of the sympathetic nervous system?

A. Pupil dilation

B. Decreased digestion

C. Increased urinary output

D. Stimulation of adrenal medulla

The sympathetic nervous system is primarily responsible for the body's "fight or flight" response, preparing the body for action in stressful situations. This response includes several physiological changes to support immediate survival needs. Pupil dilation is a function of the sympathetic nervous system, as it allows more light into the eye, enhancing vision and awareness during stressful situations. Decreased digestion is another result of sympathetic activation; when the body is preparing for action, non-essential functions such as digestion are downregulated to allocate resources to more critical systems. Stimulation of the adrenal medulla is also part of the sympathetic response, leading to the release of adrenaline (epinephrine) and norepinephrine, which helps prepare the body for a rapid response to threats. In contrast, increased urinary output is not a function of the sympathetic nervous system. During times of stress, the body generally conserves resources, and functions like urination tend to decrease rather than increase. Therefore, the correct answer identifies increased urinary output as a function not associated with sympathetic nervous system activity.

SAMPLE

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://biologicalsystemsmcat.examzify.com

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

SAMPLE