Ivy Tech APHY 101 – Muscle System Practice Test (Sample)

Study Guide

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. What term describes a bundle of muscle fibers surrounded by perimysium?

A. Fascicle

B. Endomysium

C. Myofibril

D. Tendon

2. Which region does not contain overlapping thick and thin filaments, located in the center of the thick filament region?

A. A band

B. I band

C. H zone

D. Z disc

3. Which connective tissue layer surrounds fascicles (groups of muscle fibers)?

A. Endomysium

B. Perimysium

C. Epimysium

D. Tendon

4. What directly triggers contraction after an action potential in skeletal muscle?

A. Rise in intracellular Ca2+ from the sarcoplasmic reticulum

B. Increase in intracellular Na+ concentration

C. Depletion of ATP

D. Phosphorylation of troponin

5. Which term describes the ability of a muscle to be stretched?

A. Excitability

B. Contractility

C. Extensibility

D. Elasticity

6. During contraction, thin filaments slide past thick filaments causing actin and myosin to overlap more; cross bridges form and break several times, ratcheting thin filaments toward the center of the sarcomere. Which model describes this process?

A. Sliding filament model of contraction

B. Cross-bridge cycling model

C. Z-line shortening model

D. Titin-spring model

7. At the onset of contraction, ATP is produced slowly by aerobic metabolism; what explains the subsequent rise in aerobic ATP production after about 60 seconds?

A. Increased oxygen delivery

B. Decreased ATP demand

C. Increased lactic acid production

D. Decreased breathing rate

8. The thick filaments run the entire length of an A band and are composed of which protein?

A. Actin

B. Myosin

C. Titin

D. Nebulin

9. An action potential phase in which voltage-gated Na+ channels open and Na+ influx causes depolarization to around +30 mV is the

A. Depolarizing phase

B. Repolarizing phase

C. Hyperpolarizing phase

D. Resting phase

10. A protein that forms the regulatory complex with troponin regulating the interaction of actin and myosin by blocking cross-bridge formation unless troponin is combined with calcium ions?

A. Tropomyosin

B. Troponin

C. Actin

D. Myosin

Answers

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

Explanations

1. What term describes a bundle of muscle fibers surrounded by perimysium?

A. Fascicle

B. Endomysium

C. Myofibril

D. Tendon

A fascicle is a bundle of muscle fibers wrapped by perimysium. This layer of connective tissue organizes several fibers into a cohesive unit and houses the blood vessels and nerves that supply those fibers. Inside each fascicle, each muscle fiber is surrounded by endomysium, and within each fiber lie the myofibrils—the contractile elements. The whole muscle is wrapped by an outer epimysium, and the tendon that connects muscle to bone is formed from dense regular connective tissue that continues from these coverings. So the bundle described by perimysium is a fascicle.

2. Which region does not contain overlapping thick and thin filaments, located in the center of the thick filament region?

A. A band

B. I band

C. H zone

D. Z disc

In a sarcomere, thick (myosin) and thin (actin) filaments arrange so that overlaps occur in specific regions. The central part of the sarcomere where thick filaments exist without any overlapping thin filaments is the H zone. This zone sits inside the A band and contains only thick filaments, with no actin interaction. The A band covers the full length of the thick filaments and includes overlapping areas with thin filaments; the I band contains thin filaments only and lies next to the Z disc, which marks the sarcomere boundary. So the H zone is the non-overlapping region located at the center of the thick filament region.

3. Which connective tissue layer surrounds fascicles (groups of muscle fibers)?

A. Endomysium

B. Perimysium

C. Epimysium

D. Tendon

The main idea here is how skeletal muscle is organized into layers of connective tissue that wrap different structural units. A fascicle is a bundle of muscle fibers, and the connective tissue layer that surrounds that bundle is the perimysium. The perimysium provides a protective sheath for the fibers inside the fascicle and carries larger blood vessels and nerves that service those fibers, helping coordinate force and nutrition for the bundle. Inside the fascicle, each individual muscle fiber is wrapped by the endomysium, while the entire muscle is wrapped by the epimysium. The tendon, on the other hand, is the continuation of these connective tissue layers that attaches the muscle to bone, not a layer around the fascicle.

4. What directly triggers contraction after an action potential in skeletal muscle?

A. Rise in intracellular Ca2+ from the sarcoplasmic reticulum

B. Increase in intracellular Na+ concentration

C. Depletion of ATP

D. Phosphorylation of troponin

When a skeletal muscle fiber fires an action potential, the voltage signal causes calcium to be released from the sarcoplasmic reticulum into the cytosol. That rise in intracellular Ca2+ directly triggers contraction because Ca2+ binds to troponin C on the thin filament, causing tropomyosin to move away from the myosin-binding sites on actin. With those sites uncovered, myosin heads can attach and pull, producing cross-bridge cycling and contraction. The other options don't directly start this process: a rise in intracellular Na+ is part of the action potential itself, ATP depletion would stop contraction by removing energy for cycling, and phosphorylation of troponin modulates sensitivity but doesn't initiate the immediate trigger for contraction.

5. Which term describes the ability of a muscle to be stretched?

A. Excitability

B. Contractility

C. Extensibility

D. Elasticity

Extensibility describes how much a muscle can be stretched beyond its resting length. This property lets muscles lengthen when you move through a range of motion or hold passive stretches. In contrast, elasticity is about snapping back to the original length after stretching. Since the question asks for the ability to be stretched, extensibility is the best description.

6. During contraction, thin filaments slide past thick filaments causing actin and myosin to overlap more; cross bridges form and break several times, ratcheting thin filaments toward the center of the sarcomere. Which model describes this process?

A. Sliding filament model of contraction

B. Cross-bridge cycling model

C. Z-line shortening model

D. Titin-spring model

The sliding filament model describes muscle shortening by actin filaments sliding past myosin filaments as cross-bridges repeatedly form and break. In contraction, myosin heads attach to actin, pull (power stroke), detach when a new ATP binds, and reattach further along. This repeated cycling ratchets the thin filaments toward the center of the sarcomere, increasing overlap and shortening the muscle fiber. The description you gave—filaments sliding, multiple cross-bridge events, and ratcheting inward—fits this model perfectly because it links the microscopic cross-bridge cycling to the macroscopic shortening of the sarcomere. The other ideas are less accurate: focusing on Z-line shortening would misstate how contraction occurs, and the titin-spring concept emphasizes passive elasticity rather than active shortening.

7. At the onset of contraction, ATP is produced slowly by aerobic metabolism; what explains the subsequent rise in aerobic ATP production after about 60 seconds?

A. Increased oxygen delivery

B. Decreased ATP demand

C. Increased lactic acid production

D. Decreased breathing rate

As exercise continues, the body can supply more oxygen to the working muscles, allowing the mitochondria to maximize ATP production through oxidative phosphorylation. At the start of contraction, oxygen delivery lags behind demand, so ATP comes mainly from faster, non-oxidative sources. After about a minute, heart rate and breathing rate rise and blood flow to active muscles increases, so oxygen delivery catches up. With this ample oxygen, the oxidative system can meet energy needs, causing aerobic ATP production to rise. Increased lactic acid would reflect more anaerobic metabolism, not the shift to aerobic production, and a slower breathing rate would reduce oxygen delivery, not support the increase.

8. The thick filaments run the entire length of an A band and are composed of which protein?

A. Actin

B. Myosin

C. Titin

D. Nebulin

Thick filaments in skeletal muscle are built from myosin molecules. Each myosin has a long tail that forms the filament's backbone and protruding heads that form cross-bridges with actin during contraction. The A band corresponds to the length of the thick filament, so these thick filaments run the entire length of the A band. Actin is the thin filament (found primarily in the I band and at the overlapping region within the A band), titin helps anchor thick filaments and provides elasticity, and nebulin helps align thin filaments. So the protein that makes up the thick filaments is myosin.

9. An action potential phase in which voltage-gated Na+ channels open and Na+ influx causes depolarization to around +30 mV is the

A. Depolarizing phase

B. Repolarizing phase

C. Hyperpolarizing phase

D. Resting phase

During the depolarizing phase, voltage-gated Na+ channels open in response to a stimulus, allowing Na+ to rush into the cell. This inward Na+ current makes the inside of the membrane more positive, so the membrane potential rises from the resting level (around -70 mV) toward the positive side, reaching about +30 mV. This rapid influx is what creates the sharp upstroke of the action potential. After this peak, Na+ channels inactivate and K+ channels open, which switches the process to repolarization. Hyperpolarization and the return to resting potential follow as ion gradients are restored. So the key idea is Na+ entry driving the rapid rise to a positive membrane potential—the depolarizing phase.

10. A protein that forms the regulatory complex with troponin regulating the interaction of actin and myosin by blocking cross-bridge formation unless troponin is combined with calcium ions?

A. Tropomyosin

B. Troponin

C. Actin

D. Myosin

Tropomyosin works with the troponin complex to control whether the binding sites on actin are available for myosin to attach. Tropomyosin runs along the grooves of actin filaments and blocks the myosin-binding sites when calcium isn't bound. The troponin complex sits atop tropomyosin and, when calcium ions bind to troponin C, it causes a shift that moves tropomyosin away from those sites. That exposure lets cross-bridges form and muscles contract. Actin is the filament that provides the binding sites, myosin is the motor that forms the cross-bridges, and troponin is the regulator that responds to calcium—together with tropomyosin. So the protein that forms the regulatory complex with troponin is tropomyosin.

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://ivytechaphy101musclesys.examzify.com

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