

Biomechanics Practice Exam (Sample)

Study Guide



Everything you need from our exam experts!

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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 16

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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

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- 1. Which action is not an example of sagittal plane movement?**
 - A. Shoulder hyperextension**
 - B. Hip adduction**
 - C. Knee flexion**
 - D. Plantar flexion**

- 2. Within the fields of kinesiology and exercise science, the living organism most commonly of interest to the biomechanist is what?**
 - A. Animal bodies**
 - B. Human body**
 - C. Plants**
 - D. Machines**

- 3. What is not a purpose of the patella?**
 - A. Increase the angle between the tendon and tibia**
 - B. Increase the mechanical advantage of the quadriceps**
 - C. Protect the anterior aspect of the knee**
 - D. Stabilize the humeroulnar joint**

- 4. Biomechanical efficiency is best defined as?**
 - A. The ability to lift heavier weights**
 - B. The optimal use of energy during movement**
 - C. The maximum range of motion in joints**
 - D. The overall speed of an athlete**

- 5. The human elbow during flexion is an example of which class of lever?**
 - A. 1st class**
 - B. 2nd class**
 - C. Single**
 - D. 3rd class**

- 6. Which statement is true?**
- A. Force is always a weight**
 - B. Pressure is synonymous with weight**
 - C. Weight is always a force**
 - D. Pressure is synonymous with torsion**
- 7. Which statement about angular displacement is true?**
- A. It relates only to linear movement**
 - B. It is unrelated to angular velocity**
 - C. It is the overall change in angle over time**
 - D. It is the same as linear displacement**
- 8. Which of the following pairs of muscles causes contralateral trunk rotation?**
- A. Right internal oblique and left external oblique**
 - B. Left internal oblique and right external oblique**
 - C. Both left external oblique and left internal oblique**
 - D. Right internal oblique and right external oblique**
- 9. What does the principle of "conservation of momentum" state?**
- A. Momentum can only be conserved if the forces are balanced**
 - B. Total momentum remains constant in a closed system with no external forces**
 - C. All momentum is lost when two bodies collide**
 - D. Momentum is always increased when energy is applied**
- 10. A runner completes one full lap around a 400 meter track. What is their displacement?**
- A. Zero**
 - B. 400 meters**
 - C. 400 meters x 2 pi**
 - D. 100 meters**

Answers

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

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Explanations

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1. Which action is not an example of sagittal plane movement?

- A. Shoulder hyperextension**
- B. Hip adduction**
- C. Knee flexion**
- D. Plantar flexion**

The action of hip adduction is not an example of sagittal plane movement because it primarily occurs in the frontal plane. The sagittal plane divides the body into left and right sections and is associated with movements that include flexion and extension around a coronal axis. Examples of sagittal plane movements are shoulder hyperextension, knee flexion, and plantar flexion, all of which involve moving body parts forward or backward in relation to this imaginary line. In contrast, hip adduction involves moving the leg toward the midline of the body, which is characteristic of the frontal plane. Therefore, understanding the geometric orientation of movements relative to the body's planes is essential to categorizing them correctly.

2. Within the fields of kinesiology and exercise science, the living organism most commonly of interest to the biomechanist is what?

- A. Animal bodies**
- B. Human body**
- C. Plants**
- D. Machines**

The human body is the primary focus of study for biomechanists within kinesiology and exercise science because it provides insights into human movement, performance, and the mechanical principles underlying physical activity. Biomechanists analyze how forces interact with the human body during movement, leading to a better understanding of how to improve performance, prevent injuries, and rehabilitate those who are injured. This emphasis on human biomechanics is fundamental for applications in sports science, physical therapy, and ergonomic design, making the knowledge gained invaluable in enhancing quality of life and optimizing physical capabilities. In this context, animals might be studied, but the knowledge gleaned from human biomechanics has more direct applications to human health and performance. Similarly, plants and machines, while interesting in their own right, do not provide the same insights into human physiology, adaptation, and movement efficiency that the study of the human body does. The human body's complexity, including its musculoskeletal and nervous systems, makes it uniquely significant for understanding biomechanics.

3. What is not a purpose of the patella?

- A. Increase the angle between the tendon and tibia
- B. Increase the mechanical advantage of the quadriceps
- C. Protect the anterior aspect of the knee
- D. Stabilize the humeroulnar joint**

The patella, commonly known as the kneecap, serves several key functions in the body. One of its primary roles is to increase the mechanical advantage of the quadriceps muscle group, allowing for more efficient movement and force generation during knee extension. Additionally, the patella acts as a shield for the anterior aspect of the knee, providing protection against trauma and impact. Another important function of the patella is to alter the angle between the quadriceps tendon and the tibia, which helps to optimize the force exerted by the quadriceps during movements such as walking, running, and jumping. In contrast, the stabilization of the humeroulnar joint, which is part of the elbow joint formed between the humerus and the ulna, is not a function associated with the patella. Instead, this joint is stabilized by other anatomical structures, making it clear that the patella does not play a role in this area. Therefore, identifying stabilization of the humeroulnar joint as not being a purpose of the patella is accurate.

4. Biomechanical efficiency is best defined as?

- A. The ability to lift heavier weights
- B. The optimal use of energy during movement**
- C. The maximum range of motion in joints
- D. The overall speed of an athlete

Biomechanical efficiency refers to the ability to use energy in the most effective way during movement. This means maximizing the output of force or motion while minimizing the energy expenditure required to achieve it. When an individual demonstrates efficiency in their biomechanical movements, they can perform tasks with less fatigue, greater precision, and enhanced overall performance. For instance, a runner who can maintain a steady pace with minimal energy cost is displaying biomechanical efficiency. This concept is crucial in various sports and physical activities as it allows athletes to perform better over time, reducing the risk of injury and improving endurance. The other options, while related to performance and movement, do not capture the essence of biomechanical efficiency. Lifting heavier weights, achieving maximum joint range of motion, or overall speed do not necessarily indicate that energy is being used in the most optimal way; they may involve significant energy expenditure or could occur with inefficient movement patterns.

5. The human elbow during flexion is an example of which class of lever?

- A. 1st class**
- B. 2nd class**
- C. Single**
- D. 3rd class**

The human elbow during flexion is classified as a third-class lever. In a third-class lever, the effort is applied between the fulcrum and the load. For the elbow, the fulcrum is located at the hinge joint (the elbow joint itself), the effort is applied by the muscles of the arm (such as the biceps), and the load is the weight of the forearm and any additional weight being lifted. This configuration allows for a greater range of motion and speed of movement, as the distance from the fulcrum to where the effort is applied is shorter than the distance from the fulcrum to the load. Although this lever type requires more effort to move the load, it provides the advantage of allowing for quick and extensive motions, which are essential for various activities, such as throwing or lifting. In contrast, first-class levers have the fulcrum situated between the effort and the load, second-class levers have the load located between the fulcrum and the effort, and single-class lever is not a standard biomechanical classification used to accurately describe lever systems in the human body. Thus, classifying the human elbow during flexion as a third-class lever is accurate and provides insight into how joint movements

6. Which statement is true?

- A. Force is always a weight**
- B. Pressure is synonymous with weight**
- C. Weight is always a force**
- D. Pressure is synonymous with torsion**

The statement that weight is always a force is true because weight is defined as the gravitational force exerted on an object due to its mass. It is calculated as the product of mass and the acceleration due to gravity ($W = mg$). This means that weight specifically measures the force with which an object is pulled towards the center of the Earth (or another body with mass) and is directed downward. Understanding this relationship is fundamental in biomechanics since weight influences how forces act during movement, stability, and load-bearing activities. Other terms, like pressure, define different physical concepts relating to force per unit area, and torsion relates to twisting forces rather than weight or pressure. Hence, weight being classified solely as a force provides clarity essential for understanding biomechanical principles.

7. Which statement about angular displacement is true?

- A. It relates only to linear movement**
- B. It is unrelated to angular velocity**
- C. It is the overall change in angle over time**
- D. It is the same as linear displacement**

Angular displacement refers to the change in angular position of an object. It measures how far an object has rotated about a specific axis in a given direction, typically expressed in radians or degrees. The correct statement is that angular displacement is the overall change in angle, which implies that it accounts for both the start and end positions in rotational motion. When considering the other options, the relationship of angular displacement to linear movement is not direct; they operate in different domains—angular displacement deals with rotation while linear movement pertains to straight-line motion. Additionally, angular displacement is indeed related to angular velocity, which describes how quickly that displacement occurs over time. Lastly, angular displacement is fundamentally different from linear displacement, as the latter refers to the distance moved in a straight line between two points, while angular displacement specifically concerns rotational movement around an axis. This distinction highlights the unique characteristics of the rotational motion being described by angular displacement.

8. Which of the following pairs of muscles causes contralateral trunk rotation?

- A. Right internal oblique and left external oblique**
- B. Left internal oblique and right external oblique**
- C. Both left external oblique and left internal oblique**
- D. Right internal oblique and right external oblique**

To understand why the left internal oblique and right external oblique work together to produce contralateral trunk rotation, it's important to consider their anatomical positions and how they function. The internal and external obliques are layers of muscles located on either side of the abdomen. The external oblique muscle fibers run in a downward, forward direction, and they are responsible for aiding in trunk rotation, lateral flexion, and flexion of the vertebral column. The internal oblique muscle fibers, on the other hand, run in an upward, forward direction and also assist in similar functions. When the left internal oblique contracts, it works to rotate the trunk to the right. This is due to its positioning; since the internal oblique is on the left side, its action will pull the torso in that direction. Concurrently, the right external oblique contracts to assist in this rotation. The right external oblique, being on the opposite side, enables the twisting action towards the left side, thus facilitating contralateral rotation. This coupling of the left internal oblique and right external oblique results in the trunk's rotation toward the opposite side, which exemplifies contralateral movement. This biomechanical relationship is crucial for activities that involve trunk

9. What does the principle of "conservation of momentum" state?

- A. Momentum can only be conserved if the forces are balanced**
- B. Total momentum remains constant in a closed system with no external forces**
- C. All momentum is lost when two bodies collide**
- D. Momentum is always increased when energy is applied**

The principle of "conservation of momentum" states that in a closed system, where no external forces act on it, the total momentum remains constant. This means that the sum of the momentum of all objects in that system before an event (like a collision or an explosion) will be equal to the sum of the momentum of those objects after the event. This principle is a fundamental concept in physics and is crucial in analyzing the outcomes of collisions and interactions between bodies. When we refer to a closed system, it indicates that the only forces acting are internal to that system, thus not affecting the total momentum. The preservation of momentum is a cornerstone of both classical mechanics and many areas of physics, as it helps in predicting the motion of objects after interactions. The other choices do not adequately describe the principle. While balanced forces might affect the individual motions of objects, they don't fundamentally define the conservation of momentum. The assertion that all momentum is lost in collisions is incorrect as momentum is conserved in elastic collisions, while kinetic energy may not be. Lastly, momentum is not necessarily increased when energy is applied; rather, it changes based on the interactions and does not always correlate directly with energy transfer.

10. A runner completes one full lap around a 400 meter track. What is their displacement?

- A. Zero**
- B. 400 meters**
- C. 400 meters x 2 pi**
- D. 100 meters**

Displacement is a vector quantity that refers to the change in position of an object. It is defined as the shortest straight-line distance from the initial position to the final position, along with the direction of that line. In the case of a runner completing one full lap around a 400 meter track, the runner starts and ends at the same point. Since displacement considers only the initial and final positions and not the path taken, the displacement in this scenario is zero. The runner has returned to their starting point, meaning there is no net change in position, which results in a displacement of zero meters. This understanding of displacement distinguishes it from distance, which would account for the entire length of the track covered by the runner. Thus, the correct response reflects this principle of displacement in physics.

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://biomech.examzify.com>

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

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