KINEMATICS AND KINETICS IN HUMAN MOVEMENT PRACTICE TEST (SAMPLE)

STUDY GUIDE

SAMPLE STUDY GUIDE WITH LIMITED QUESTIONS

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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. Open-chain vs closed-chain activity is best described by which statement?

A. Open chain: one end is free to move; Closed chain: both ends are constrained.

B. Open chain: both ends constrained; Closed chain: one end free.

C. Both ends move freely in open chain; Closed chain: only rotation.

D. Open chain is always more functional.

2. Which term is the point through which the gravitational force acts, near Earth treated as equivalent to the center of mass?

A. Center of Mass

B. Center of Gravity

C. Line of Gravity

D. Base of Support

3. Which statement describes the difference between the center of rotation (CoR) and the instantaneous center of rotation (ICoR)?

A. CoR is the fixed axis of rotation for entire motion

B. CoR is the point/axis around which true rotary motion occurs; ICoR is the apparent center at a single instant during curvilinear motion

C. CoR is the center of gravity

D. CoR and ICoR are identical concepts used interchangeably

4. If Force increases by 50% and Moment Arm decreases by 50%, the torque will

A. Decreases by 25%.

B. Increases by 25%.

C. Doubles.

D. Remains the same.

5. Which describes a closed-chain movement?

A. The distal end is free to move.

B. The proximal end is free to move.

C. The ends are unconstrained.

D. The distal end is fixed to a surface, with the proximal joints moving as a unit on the fixed surface.

6. Which statement describes how torque depends on force, lever arm, and angle?

A. Torque depends on force magnitude, moment arm length, and angle between force and lever arm.

B. Torque depends only on the force magnitude.

C. Torque is independent of lever arm.

D. Torque equals force times velocity.

7. Which statement describes a pulley's biomechanical function?

A. It lengthens the muscle.

B. It reduces the line of pull.

C. It only affects speed.

D. It redirects force and increases the moment arm and torque.

8. If you double the net force while keeping mass constant, what happens to acceleration?

A. It doubles.

B. It halves.

C. It stays the same.

D. It becomes zero.

9. Which description correctly defines the first-class lever?

A. Resistance lies between axis and effort.

B. Axis lies between effort and resistance.

C. Effort lies between axis and resistance.

D. There is no axis movement in first class.

10. What is shear in terms of forces?

A. Force acts perpendicular to a surface, pushing segments together.

B. Force acts parallel to an articular surface, tending to slide one segment relative to another.

C. Force causes bending.

D. Force causes torsion.

Answers

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

Explanations

1. Open-chain vs closed-chain activity is best described by which statement?

A. Open chain: one end is free to move; Closed chain: both ends are constrained.

B. Open chain: both ends constrained; Closed chain: one end free.

C. Both ends move freely in open chain; Closed chain: only rotation.

D. Open chain is always more functional.

In open-chain movements the end of the limb that moves freely is not fixed to a surface, so it can travel through space while the rest of the limb can move independently. In closed-chain movements the end that contacts a surface is constrained, so the limb is effectively fixed at that point and movement occurs with multiple joints working together along a linked sequence. This is why the statement "open chain: one end is free to move; closed chain: both ends are constrained" best describes the distinction. For example, a leg extension where the foot moves freely is open-chain, while a squat with the feet planted on the floor is closed-chain because the distal end is fixed to a surface. The other options misstate how ends are constrained or imply limits (like only rotation) that don't reflect the typical multi-joint nature of closed-chain movements, and they suggesting open-chain is always more functional, which isn't accurate in practice.

2. Which term is the point through which the gravitational force acts, near Earth treated as equivalent to the center of mass?

A. Center of Mass

B. Center of Gravity

C. Line of Gravity

D. Base of Support

Gravity can be treated as a single force acting downward at one point on the body. That point is the center of gravity—the point through which the entire weight vector can be considered to act. Near Earth, the gravitational field is nearly uniform, so this center of gravity is essentially the same as the center of mass, the average location of the body's mass. This equivalence lets us simplify balance and posture analyses by thinking of the weight as acting at a single point along a vertical line through the center of gravity. The line of gravity describes that vertical path, while the base of support is simply the contact area with the ground that shapes stability. The term that denotes the point where gravity effectively acts is center of gravity.

3. Which statement describes the difference between the center of rotation (CoR) and the instantaneous center of rotation (ICoR)?

A. CoR is the fixed axis of rotation for entire motion

B. CoR is the point/axis around which true rotary motion occurs; ICoR is the apparent center at a single instant during curvilinear motion

C. CoR is the center of gravity

D. CoR and ICoR are identical concepts used interchangeably

In planar rigid-body motion, you can describe rotation in two related ways. When the motion is a true rotation about a fixed axis, there is a center of rotation—the axis itself around which all points rotate. When the motion is not a pure rotation, you can still identify an instantaneous center of rotation: the unique point that has zero velocity at that particular moment. This instantaneous center is not fixed and can move as the motion progresses. A helpful example is a wheel rolling without slipping. The wheel is rotating about its central axis, so the center of rotation describes the true rotary motion. At the same moment, the point where the wheel touches the ground has zero velocity, making it the instantaneous center of rotation for that instant. As the wheel continues to move, the instantaneous center shifts along the contact path, while the true axis of rotation remains through the wheel's center. So the statement that captures the distinction is that the center of rotation is the axis around which true rotary motion occurs, while the instantaneous center of rotation is the apparent center at a single instant during curvilinear motion. The two concepts align when the motion is a pure rotation about a fixed axis but differ when the motion includes translation or changing directions.

4. If Force increases by 50% and Moment Arm decreases by 50%, the torque will

A. Decreases by 25%.

B. Increases by 25%.

C. Doubles.

D. Remains the same.

Torque is the product of force and the moment arm. If the force increases by 50%, you multiply it by 1.5. If the moment arm decreases by 50%, you multiply it by 0.5. The new torque relative to the original is 1.5 × 0.5 = 0.75, so torque becomes 75% of its initial value—a 25% decrease. This shows how the two changes combine multiplicatively. Doubling or remaining the same would require different factors to align to a total multiplier of 2 or 1, which isn't the case here.

5. Which describes a closed-chain movement?

A. The distal end is free to move.

B. The proximal end is free to move.

C. The ends are unconstrained.

D. The distal end is fixed to a surface, with the proximal joints moving as a unit on the fixed surface.

Closed-chain movement occurs when the far end of the limb is fixed to a surface, so the remaining joints move together as a connected unit against that fixed point. This setup constrains motion because the distal segment cannot slide freely; instead, forces are transmitted through multiple joints in a coordinated way. That description matches the option where the distal end is fixed to a surface, with the proximal joints moving as a unit on that fixed surface. Think of actions like standing up, a squat, or a push-up—the feet or hands stay planted, and the hips, knees, and trunk move in a linked sequence on that fixed base. If the distal end could move freely, or if the proximal ends moved independently, those would be open-chain or non-closed-chain movements, where the distal segments aren't constrained by a fixed surface. Ends unconstrained isn't a defined closed-chain pattern.

6. Which statement describes how torque depends on force, lever arm, and angle?

A. Torque depends on force magnitude, moment arm length, and angle between force and lever arm.

B. Torque depends only on the force magnitude.

C. Torque is independent of lever arm.

D. Torque equals force times velocity.

Torque measures how effectively a force can rotate an object about a pivot. It depends on three things: how big the force is, how far from the pivot the force is applied (the lever arm), and the direction of the force relative to that lever arm. The magnitude of torque is given by $\tau = r F \sin(\theta)$, where r is the lever arm length and θ is the angle between the force and the lever arm. This means torque grows with a larger force, a longer lever arm, and a force that is more perpendicular to the lever arm. If the force is aligned with the lever arm ($\theta = 0$ or 180 degrees), the torque is zero even if the force is large. The statement that includes all three factors—force magnitude, lever arm length, and the angle between force and lever arm—best captures how torque depends on these elements. Torque is not simply force, nor is it force times velocity (that would relate to power, not torque itself).

7. Which statement describes a pulley's biomechanical function?

A. It lengthens the muscle.

B. It reduces the line of pull.

C. It only affects speed.

D. It redirects force and increases the moment arm and torque.

A pulley in biomechanics redirects the tendon's force around a joint to change the line of pull and increase the distance from the joint's axis (the moment arm). When the line of action is redirected so it acts farther from the joint center, the moment arm grows, and the torque the muscle can produce at the joint increases. This means the same muscle force can generate more rotation or produce the desired movement more efficiently. Pulleys don't lengthen the muscle, and they don't inherently only affect speed; their main role is changing direction and leverage to enhance torque.

8. If you double the net force while keeping mass constant, what happens to acceleration?

A. It doubles.

B. It halves.

C. It stays the same.

D. It becomes zero.

Acceleration scales with the net force when mass is fixed. According to a = F_net / m, if you double the net force and keep mass constant, the acceleration doubles. For example, with m = 2 kg, increasing F_net from 10 N to 20 N changes a from 5 m/s^2 to 10 m/s^2. The other possibilities (halving or staying the same or dropping to zero) would require changing mass or the net force in different ways, but with mass fixed and force doubled, acceleration must double.

9. Which description correctly defines the first-class lever?

A. Resistance lies between axis and effort.

B. Axis lies between effort and resistance.

C. Effort lies between axis and resistance.

D. There is no axis movement in first class.

The key idea is how a lever is organized around its pivot (the axis). In a first-class lever, the pivot sits between the force you apply (effort) and the load you're moving (resistance). This arrangement means the two sides of the lever rotate about the same central point, so you're creating torques on opposite sides of the pivot. Whether you gain a mechanical advantage or not depends on how far the effort is from the pivot compared with how far the resistance is. A classic example is a seesaw: the fulcrum is in the middle, with effort on one side and a load on the other, balanced around that central axis. That's why the description where the axis lies between effort and resistance is the correct one for a first-class lever. If the axis were not between them, you'd be describing a different lever class, and if the statement claimed there is no axis movement, that would not fit the lever concept at all. In short, first-class levers are defined by a pivot located between the input force and the load, allowing the system to balance or magnify effort depending on arm lengths.

10. What is shear in terms of forces?

A. Force acts perpendicular to a surface, pushing segments together.

B. Force acts parallel to an articular surface, tending to slide one segment relative to another.

C. Force causes bending.

D. Force causes torsion.

Shear is a force that acts parallel to a surface, tending to slide one part of a body relative to another. In joints, this means a force that runs along the articular surface, trying to make the bones or cartilage slide past each other rather than push into or pull away from each other. This is different from a force that acts perpendicular to a surface, which would cause compression (pushing together) or tension (pulling apart). It's also distinct from bending, which involves a moment that creates different stresses across a cross-section, and from torsion, which twists along the limb's axis. A simple way to picture shear is sliding the top layer of a deck of cards across the layer beneath—the motion is parallel to the surface.

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://kinematicskineticsinhumanmov.examzify.com

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