

ARIZONA STATE UNIVERSITY (ASU) PHY 131 EXAM 1 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

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1. The electric field strength due to a point charge varies with distance r from the charge as which relation?
- A. $1/r^2$
 - B. r
 - C. $\sqrt{r}$
 - D. constant
2. Rank the net electric flux through each Gaussian surface shown from most negative to most positive: A inside a sphere carrying Q , B outside a sphere carrying $4Q$, C inside a cube carrying Q , D inside a cylinder carrying $-3Q$.
- A. $D < B < A = C$
 - B. $A = C < B < D$
 - C. $B < D < A = C$
 - D. $D < A < B = C$
3. Which statement about field lines is true?
- A. They originate at positive charges and terminate at negative charges.
 - B. They point away from negative charges and toward positive charges.
 - C. They are independent of charge sign.
 - D. They form closed loops around charges.
4. Pressure produced by a 12 N force applied to an area of 0.01 m^2 is:
- A. 1200 Pa
 - B. 120 Pa
 - C. 12 Pa
 - D. 0.12 Pa
5. A block on a 30-degree incline with $\mu_s = 0.50$ is just about to slide. Given $mg \sin \theta = 9.8 \text{ N}$ and $\mu_s N = 8.0 \text{ N}$, does it slide?
- A. No
 - B. Yes
 - C. Only if μ_s increases
 - D. Cannot determine

- 6. Which statement best describes conservation of electric charge?**
- A. Electric charge can be created freely
 - B. Electric charge is conserved
 - C. Charge conservation applies only in static conditions
 - D. Only positive charge is conserved
- 7. In a closed system with only internal forces acting, what is true about total momentum?**
- A. It can change
 - B. It is conserved
 - C. It becomes zero after collision
 - D. It always increases
- 8. The electric force on a point charge is proportional to the magnitude of the point charge.**
- A. True
 - B. False
 - C. True only if the field is uniform
 - D. Proportional to the square of the charge
- 9. Electric field lines originate on positive charges and terminate on negative charges. Which of the following is true about field lines?**
- A. Field lines originate from positive charges and terminate on negative charges
 - B. Field lines originate from negative charges and terminate on positive charges
 - C. Field lines originate and terminate on the same charge
 - D. Field lines do not begin or end at charges
- 10. Where do charges reside on a hollow conducting sphere with a cavity and no charges inside the cavity?**
- A. Inner surface
 - B. Outer surface
 - C. Uniformly throughout the conductor
 - D. Randomly distributed on the outer surface

Answers

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

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Explanations

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1. The electric field strength due to a point charge varies with distance r from the charge as which relation?

A. $1/r^2$

B. r

C. $\sqrt{r}$

D. constant

The main idea is that a point charge's electric field spreads out uniformly in all directions, so its influence weakens as the surface area of a sphere grows with distance. Coulomb's law says the force between a real charge and a test charge is $F = k q Q / r^2$, and the electric field is that force per unit charge, $E = F/Q = k q / r^2$. So the field strength decreases with the square of the distance from the charge, not with distance linearly, as a square root, or remaining constant. Intuitively, as you move farther away, the same total "influence" is spread over a larger spherical area $4\pi r^2$, leading to the $1/r^2$ dependence.

2. Rank the net electric flux through each Gaussian surface shown from most negative to most positive: A inside a sphere carrying Q , B outside a sphere carrying $4Q$, C inside a cube carrying Q , D inside a cylinder carrying $-3Q$.

A. $D < B < A = C$

B. $A = C < B < D$

C. $B < D < A = C$

D. $D < A < B = C$

Gauss's law says the total electric flux through a closed surface equals the enclosed charge divided by ϵ_0 , with the sign set by the outward normal. To rank the fluxes, we just count how much charge lies inside each surface. The surface inside the cylinder carries negative charge, so it encloses that negative charge and has flux $-3Q/\epsilon_0$. The surface outside the sphere carries positive charge, so it encloses all of that positive charge and has flux $+4Q/\epsilon_0$. The other two surfaces lie inside charged objects in such a way that no net charge is enclosed, giving zero flux for each. Putting that together, the fluxes go from the most negative to the most positive as follows: $-3Q/\epsilon_0$, 0, 0, $+4Q/\epsilon_0$. So the surface with the negative charge is the most negative, the two surfaces with zero enclosed charge are equal, and the surface enclosing the positive charge is the largest positive. In summary: $D < A = C < B$.

3. Which statement about field lines is true?

A. They originate at positive charges and terminate at negative charges.

B. They point away from negative charges and toward positive charges.

C. They are independent of charge sign.

D. They form closed loops around charges.

Field lines show the direction of the electric field, pointing away from positive charges and toward negative charges. That means lines must start on positive charges and end on negative charges, so the statement describing that behavior is the true one. The direction of a line depends on the sign of the nearby charge, so they're not independent of charge sign. And in electrostatics these lines don't form closed loops around a charge; they begin or end on charges (or go off to infinity if there's a net charge), reflecting the presence of sources and sinks in the field.

4. Pressure produced by a 12 N force applied to an area of 0.01 m^2 is:

A. 1200 Pa

B. 120 Pa

C. 12 Pa

D. 0.12 Pa

Pressure is the force per unit area. With a 12 N force over 0.01 m^2 , use $P = F/A = 12 / 0.01 = 1200 \text{ N/m}^2$, so the pressure is 1200 Pa. This is the correct result because pressure increases as the same force is applied to a smaller area. If the area were larger, the pressure would be smaller (for example, 12 N on 0.1 m^2 gives 120 Pa). Conversely, much larger areas would yield even smaller pressures (e.g., 12 N on 1 m^2 gives 12 Pa; 12 N on 100 m^2 gives 0.12 Pa).

5. A block on a 30-degree incline with $\mu_s = 0.50$ is just about to slide. Given $mg \sin \theta = 9.8 \text{ N}$ and $\mu_s N = 8.0 \text{ N}$, does it slide?

A. No

B. Yes

C. Only if μ_s increases

D. Cannot determine

The main idea is that static friction can oppose motion up to a maximum value of $\mu_s N$. A block on an incline stays at rest only if the downslope component of gravity, $mg \sin \theta$, is less than or equal to that maximum friction, $\mu_s N$. Here the downslope force is 9.8 N, while the maximum static friction is 8.0 N, so gravity's pull down the slope exceeds what friction can hold. That means the block cannot remain at rest and will start to slide.

6. Which statement best describes conservation of electric charge?

A. Electric charge can be created freely

B. Electric charge is conserved

C. Charge conservation applies only in static conditions

D. Only positive charge is conserved

Charge conservation means the total amount of electric charge in an isolated system stays the same, even as charges move around or redistribute. Charges can transfer from one object to another or flow through a circuit, but the net charge before and after interactions remains equal. This holds in both static and dynamic situations, and it's why processes like rubbing objects, charging by contact, or current flow in a wire don't create or destroy charge overall. Even when particles are created in pairs, the total charge is preserved because the new charges come with equal and opposite values. So the best statement is that electric charge is conserved. The other ideas—creating charge freely, applying conservation only in static conditions, or conserving only positive charge—don't fit because they violate the universal, overall bookkeeping that keeps net charge constant.

7. In a closed system with only internal forces acting, what is true about total momentum?

- A. It can change
- B. It is conserved**
- C. It becomes zero after collision
- D. It always increases

The total momentum stays the same when only internal forces act in a closed system. Each internal force is paired with an opposite force on another part of the system (Newton's third law), so the impulses they impart cancel out when you add up all the bodies. Since there are no external forces, the net external impulse is zero, which means the time derivative of the total momentum is zero. Therefore the total momentum is conserved: it has the same value before and after any interaction, such as a collision, though individual objects can exchange momentum with each other. It does not necessarily become zero, nor does it have to increase.

8. The electric force on a point charge is proportional to the magnitude of the point charge.

- A. True**
- B. False
- C. True only if the field is uniform
- D. Proportional to the square of the charge

Electric force scales linearly with the amount of charge. In a fixed electric field E , the force on a charge q is $F = qE$, so the magnitude is $|F| = |q||E|$. This means doubling the charge doubles the force, and the force direction follows the sign of q (positive charges feel force along E , negative opposite). This proportionality holds regardless of whether the field is uniform, so the statement is true.

9. Electric field lines originate on positive charges and terminate on negative charges. Which of the following is true about field lines?

- A. Field lines originate from positive charges and terminate on negative charges**
- B. Field lines originate from negative charges and terminate on positive charges
- C. Field lines originate and terminate on the same charge
- D. Field lines do not begin or end at charges

Electric field lines visualize both the direction and strength of the field. They point in the direction a positive test charge would move, and their density indicates how strong the field is in that region. By convention, lines begin on positive charges and end on negative charges, so in a system with both kinds of charge they radiate away from positives and curve toward negatives. This setup makes the statement true: field lines originate from positive charges and terminate on negative charges. They don't start on negative charges, they don't loop back to end on the same charge, and when there's a lone charge they can extend to infinity rather than end on a charge.

10. Where do charges reside on a hollow conducting sphere with a cavity and no charges inside the cavity?

- A. Inner surface
- B. Outer surface
- C. Uniformly throughout the conductor**
- D. Randomly distributed on the outer surface

Charges in electrostatic equilibrium reside on surfaces, leaving the interior of a conductor field-free. For a hollow conducting sphere with a cavity that contains no charge, there's no field in the cavity to induce any charge on the inner surface, so the inner surface carries no net charge. All the excess charge then moves to the outer surface. Because the outer surface is a symmetric sphere, the charge distributes uniformly over it. The charge does not spread through the bulk of the conductor.

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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://asu-phy131exam1.examzify.com>

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

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