

Clover Learning Physics Practice Test (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	15

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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 factor, when high, contributes to achieving the highest spatial resolution alongside small DEL size and small DEL pitch?**
 - A. Low fill factor**
 - B. Medium fill factor**
 - C. High fill factor**
 - D. No fill factor**
- 2. If 1 μg of mass is converted completely to energy, what is the energy released? Use $c = 3.0 \times 10^8 \text{ m/s}$.**
 - A. $9 \times 10^7 \text{ J}$ (90 MJ)**
 - B. $9 \times 10^6 \text{ J}$ (9 MJ)**
 - C. $9 \times 10^8 \text{ J}$ (900 MJ)**
 - D. $9 \times 10^5 \text{ J}$ (0.9 MJ)**
- 3. Which focal spot size yields the highest spatial resolution: 0.6 mm or 2.0 mm?**
 - A. 2.0 mm**
 - B. 1.0 mm**
 - C. 0.6 mm**
 - D. 1.5 mm**
- 4. Which expression gives the magnetic field around a long straight wire carrying current I at distance r ?**
 - A. $B = \mu_0 I / (4\pi r)$**
 - B. $B = \mu_0 I / (\pi r)$**
 - C. $B = \mu_0 I / (2\pi r)$**
 - D. $B = \mu_0 I r / (2\pi)$**
- 5. Which clinical finding would most likely decrease subject contrast on an abdominal radiograph?**
 - A. Ascites**
 - B. Pneumothorax**
 - C. Chest radiograph with severe scoliosis**
 - D. Pulmonary edema**

- 6. Which image quality factor is defined as the structural sharpness recorded in a radiographic image?**
- A. Contrast resolution**
 - B. Spatial resolution**
 - C. Image noise**
 - D. Dynamic range**
- 7. Beam geometry in radiographic imaging is defined by which three factors?**
- A. Focal spot size, tube voltage, and exposure time**
 - B. Source-to-image distance (SID), Object-to-image distance (OID), and Tube angulation**
 - C. OID, patient thickness, and filtration**
 - D. SID, exposure, and grid ratio**
- 8. What primarily controls the display monitor spatial resolution?**
- A. Pixel density**
 - B. Matrix size**
 - C. Refresh rate**
 - D. Screen brightness**
- 9. If an image shows long gray-scale and many shades of gray, what is the implied contrast level?**
- A. High contrast**
 - B. Moderate contrast**
 - C. Low contrast**
 - D. Very low contrast**
- 10. Which post-processing factor affects the displayed image contrast?**
- A. Window width (WW)**
 - B. Histogram analysis**
 - C. Subject contrast**
 - D. Exposure index**

Answers

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

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Explanations

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1. Which factor, when high, contributes to achieving the highest spatial resolution alongside small DEL size and small DEL pitch?

A. Low fill factor

B. Medium fill factor

C. High fill factor

D. No fill factor

High fill factor is essential for the best spatial resolution when the detector elements are already small and tightly packed. When DEL size and DEL pitch are small, the gaps between active areas would otherwise become a bigger fraction of the total area. A high fill factor means most of each element's area is sensitive and capable of collecting signal, so events are localized to the correct pixel with less loss or blurring at the boundaries. This reduces dead space and minimizes charge sharing across neighboring DELs, sharpening the map of where the event occurred. If the fill factor were low, those gaps and boundary effects would blur the position information, even with tiny elements, limiting the achievable resolution. So, maximizing the active area relative to the pixel area—high fill factor—best supports achieving the highest spatial resolution alongside small DEL size and small DEL pitch.

2. If 1 μg of mass is converted completely to energy, what is the energy released? Use $c = 3.0 \times 10^8 \text{ m/s}$.

A. $9 \times 10^7 \text{ J}$ (90 MJ)

B. $9 \times 10^6 \text{ J}$ (9 MJ)

C. $9 \times 10^8 \text{ J}$ (900 MJ)

D. $9 \times 10^5 \text{ J}$ (0.9 MJ)

Mass-energy equivalence is $E = mc^2$. Convert 1 μg to kilograms: $1 \mu\text{g} = 1 \times 10^{-9} \text{ kg}$. With $c = 3.0 \times 10^8 \text{ m/s}$, $c^2 = 9.0 \times 10^{16}$. Multiply: $E = (1 \times 10^{-9} \text{ kg})(9.0 \times 10^{16}) = 9.0 \times 10^7 \text{ J}$. So the energy released is 9×10^7 joules (about 90 MJ).

3. Which focal spot size yields the highest spatial resolution: 0.6 mm or 2.0 mm?

A. 2.0 mm

B. 1.0 mm

C. 0.6 mm

D. 1.5 mm

Spatial resolution improves as the focal spot size decreases. The focal spot is the effective X-ray source, and a finite size creates geometric blur (penumbra) on the image. A larger spot bleeds the image more, smearing fine details, while a smaller spot keeps the rays more tightly defined. So a 0.6 mm focal spot produces much less blur than a 2.0 mm spot, allowing finer structures to be resolved. That's why 0.6 mm yields higher spatial resolution. Keep in mind that smaller spots can increase tube heat load and affect exposure settings, which is why they're chosen for detailed imaging.

4. Which expression gives the magnetic field around a long straight wire carrying current I at distance r ?

- A. $B = \mu_0 I / (4\pi r)$
- B. $B = \mu_0 I / (\pi r)$
- C. $B = \mu_0 I / (2\pi r)$**
- D. $B = \mu_0 I r / (2\pi)$

The magnetic field around a long straight current-carrying wire decreases with distance as $1/r$. To find its magnitude at a distance r , apply Ampere's law: $\oint \mathbf{B} \cdot d\mathbf{l} = \mu_0 I_{\text{enclosed}}$. Choose a circular path of radius r around the wire. The field is tangential and has the same magnitude all along that circle, so the line integral is $B(2\pi r)$. This must equal $\mu_0 I$, so $B = \mu_0 I / (2\pi r)$. The direction is tangential to the circle, determined by the right-hand rule: if the current goes in the thumb direction, the magnetic field circulates in the direction your fingers wrap. The other expressions don't fit because replacing B with $\mu_0 I / (4\pi r)$ would give half the correct value, $\mu_0 I / (\pi r)$ would give twice the correct value, and $\mu_0 I r / (2\pi)$ would imply the field grows with distance, which isn't true for a long straight wire.

5. Which clinical finding would most likely decrease subject contrast on an abdominal radiograph?

- A. Ascites**
- B. Pneumothorax
- C. Chest radiograph with severe scoliosis
- D. Pulmonary edema

Subject contrast depends on differences in X-ray attenuation between neighboring tissues. On an abdominal image, the contrast you mainly see comes from gas in the bowel (which is very low attenuation) contrasting with soft tissue. When ascites is present, fluid fills the peritoneal cavity and makes the abdomen more uniform in density, so the distinct differences between structures diminish. The result is a more low-contrast, smooth image where borders between organs are less conspicuous. The other findings don't produce that same smoothing effect in the abdomen: a pneumothorax adds air in the chest but doesn't change abdominal attenuation patterns; severe scoliosis mainly causes geometric distortion rather than reducing tissue contrast; pulmonary edema increases density in the chest, not the abdominal region, so it doesn't decrease abdominal subject contrast significantly.

6. Which image quality factor is defined as the structural sharpness recorded in a radiographic image?

- A. Contrast resolution**
- B. Spatial resolution**
- C. Image noise**
- D. Dynamic range**

Structural sharpness in a radiographic image is all about how clearly edges and fine details are defined. That crispness is what we call spatial resolution. It reflects how small a feature the system can distinguish and how sharply outlines appear. When spatial resolution is high, edges look crisp and fine structures are separable; when it's low, edges blur and small details blend together. Contrast resolution, on the other hand, is about distinguishing different gray shades, not edge sharpness. Image noise refers to random graininess that can obscure detail, and dynamic range is about the span of brightness the system can capture, not how sharp features are. So the factor that best matches "structural sharpness" is spatial resolution.

7. Beam geometry in radiographic imaging is defined by which three factors?

- A. Focal spot size, tube voltage, and exposure time**
- B. Source-to-image distance (SID), Object-to-image distance (OID), and Tube angulation**
- C. OID, patient thickness, and filtration**
- D. SID, exposure, and grid ratio**

Beam geometry is determined by how the X-ray beam is arranged relative to the object and the image receptor. The three factors that define this arrangement are the Source-to-Image Distance (SID), the Object-to-Image Distance (OID), and the angle of the tube relative to the object. SID describes how far the focal spot is from the image receptor. A longer SID reduces magnification and improves sharpness, while a shorter SID increases magnification and can blur details if the object sits between the beam and the receptor. OID is the gap between the object being imaged and the image receptor. A larger OID increases magnification and blur because the object's image is spread over a larger area on the receptor, making fine details harder to resolve. Tube angulation refers to tilting the beam or the object, which changes the projection of the object onto the receptor and introduces distortion (foreshortening or elongation) depending on the direction of the tilt. Other factors like focal spot size, exposure settings, or filtration affect dose, contrast, or scatter, but they do not define the fundamental beam geometry in the way SID, OID, and tube angulation do. The combination of SID, OID, and tube angulation directly describes magnification, sharpness, and distortion—the core aspects of beam geometry.

8. What primarily controls the display monitor spatial resolution?

- A. Pixel density**
- B. Matrix size**
- C. Refresh rate**
- D. Screen brightness**

Spatial resolution is about how many individual picture elements (pixels) the screen can display across its width and height. That total comes from the matrix size—the grid of pixels on the display. A larger matrix means more pixels and higher resolution. Pixel density only changes how sharp that fixed number of pixels looks on a given screen size, not how many pixels the screen actually has. Refresh rate and brightness affect update speed and luminance, not the number of pixels. So, the matrix size is what primarily controls the display's spatial resolution.

9. If an image shows long gray-scale and many shades of gray, what is the implied contrast level?

- A. High contrast**
- B. Moderate contrast**
- C. Low contrast**
- D. Very low contrast**

Contrast is about how far apart the lightest and darkest parts of an image are. An image that shows a long gray-scale with many shades means there are many steps between light and dark, but those steps are subtle. The overall difference between the brightest and darkest values isn't large, so the picture looks flat and the transitions between tones are gentle. That's why the implied contrast level is low. In high contrast you'd see bright whites and deep blacks with sharp edges; in moderate contrast you'd notice more separation than in a flat, gray-toned image, but still not extreme.

10. Which post-processing factor affects the displayed image contrast?

- A. Window width (WW)**
- B. Histogram analysis**
- C. Subject contrast**
- D. Exposure index**

Display contrast is controlled by the window width during post-processing. The window width sets the range of pixel values that are mapped to the display's grayscale. Narrowing that width uses a smaller range of values, so small differences between tissues become more distinct and the image appears higher in contrast. Widening the width includes more gray levels, giving a softer, flatter look with lower contrast. Among the options, window width is the direct factor that changes how contrasted the displayed image appears. Histogram analysis can tweak brightness through automatic scaling, but it isn't the primary knob for contrast; subject contrast is about actual tissue differences, and exposure index relates to dose, not how the image is displayed.

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://cloverlearningphysics.examzify.com>

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

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