

RADIOLOGY PHYSICS PRACTICE TEST (SAMPLE)

STUDY GUIDE



SAMPLE STUDY GUIDE WITH LIMITED QUESTIONS

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THE FULL VERSION STUDY GUIDE

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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. What is the minimum lead equivalent required for a lead drape?**
 - A. 0.15 mm
 - B. 0.25 mm
 - C. 0.35 mm
 - D. 0.45 mm
- 2. What is the primary interaction responsible for image contrast in radiographs?**
 - A. Photoelectric effect
 - B. Compton effect
 - C. Scatter radiation
 - D. Pair production
- 3. What factor positively influences the consistency of radiographic outputs?**
 - A. Measurement accuracy
 - B. Speed of exposure
 - C. Use of high-quality film
 - D. Cold storage of chemicals
- 4. What is the electric charge of an electron?**
 - A. Positive
 - B. Negative
 - C. No charge
 - D. Neutral
- 5. Which feature is NOT a function of the anode in an x-ray tube?**
 - A. Thermal conductor
 - B. Mechanical support
 - C. Electrical insulator
 - D. Electrical conductor
- 6. What is the maximum number of electrons that can occupy the L shell?**
 - A. 2
 - B. 8
 - C. 18
 - D. 32

- 7. Which side of the x-ray beam is more intense due to the heel effect?**
- A. Anode
 - B. Cathode
 - C. Central ray
 - D. Periphery
- 8. What is one of the benefits of using a rotating anode?**
- A. Higher tube currents
 - B. Increased film density
 - C. Longer exposure times
 - D. Lower contrast
- 9. What is the minimum source to skin distance required for mobile fluoroscopy units?**
- A. 10 inches
 - B. 12 inches
 - C. 15 inches
 - D. 20 inches
- 10. What is the primary advantage of digital radiography over film-based radiography?**
- A. Immediate image availability and the ability to manipulate images digitally
 - B. Lower cost of materials used
 - C. More detailed images with higher resolution
 - D. Less energy required for image production

Answers

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

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Explanations

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1. What is the minimum lead equivalent required for a lead drape?

- A. 0.15 mm
- B. 0.25 mm**
- C. 0.35 mm
- D. 0.45 mm

The minimum lead equivalent required for a lead drape is 0.25 mm. This level of lead equivalency is established based on safety standards to adequately protect against ionizing radiation during various diagnostic and therapeutic procedures in radiology. Lead drapes are an essential component in minimizing radiation exposure to both patients and medical staff. The 0.25 mm lead equivalent is deemed sufficient for absorbing low-energy X-rays and gamma rays, which are commonly encountered in radiological environments. This protection level balances the need for effective shielding while also maintaining flexibility and usability for medical professionals during procedures. Higher levels of lead equivalency may provide additional protection but are often less practical in terms of weight and mobility, making the 0.25 mm standard a widely accepted minimum in practice.

2. What is the primary interaction responsible for image contrast in radiographs?

- A. Photoelectric effect**
- B. Compton effect
- C. Scatter radiation
- D. Pair production

The primary interaction responsible for image contrast in radiographs is the photoelectric effect. This interaction occurs when X-ray photons are absorbed by the tissues in the body, specifically when they transfer enough energy to an inner-shell electron of an atom in the tissue, resulting in the electron being ejected from its orbit. The significance of the photoelectric effect in radiography lies in its dependence on the atomic number of the tissue being imaged and the energy of the incident photons. Tissues with higher atomic numbers, like bone, have a greater probability of absorbing X-rays through the photoelectric effect compared to lower atomic number tissues, such as muscles or fat. This differential absorption creates the contrast seen on the radiograph—the denser structures appear lighter (more opaque) because they absorb more radiation, while less dense structures appear darker due to fewer X-rays being absorbed. Other interactions play roles in imaging, but they primarily contribute to either reducing overall image quality or producing unwanted noise rather than enhancing contrast. The Compton effect, which involves the scattering of X-ray photons and results in reduced image quality, doesn't contribute as effectively to contrast as the photoelectric effect does. Scatter radiation is a byproduct of other interactions, like the Compton effect, and mainly affects image

3. What factor positively influences the consistency of radiographic outputs?

- A. Measurement accuracy
- B. Speed of exposure
- C. Use of high-quality film
- D. Cold storage of chemicals

The consistency of radiographic outputs is greatly influenced by measurement accuracy. When radiographic techniques, such as exposure time, tube current, and kVp (kilovolt peak), are measured accurately, it ensures that each exposure delivers the same amount of radiation to the film or detector. This level of precision leads to uniformity in image quality, as variations in exposure can create differences in contrast and density on the radiograph. Accurate measurements reduce the variability in output that could otherwise result from fluctuations in exposure settings or equipment performance, thus positively affecting the consistency of the images produced. In contrast, the speed of exposure, while relevant to the timing of image capture, does not inherently ensure consistent outputs across multiple radiographs. The use of high-quality film can improve overall image quality; however, it does not address the variability that may arise from inconsistent exposure settings. Cold storage of chemicals is important for preserving the longevity of processing solutions but does not directly impact the repeatability of radiographic results. Each of these factors has its place in the overall imaging process, but measurement accuracy stands out as the most direct influence on achieving consistent radiographic outputs.

4. What is the electric charge of an electron?

- A. Positive
- B. Negative
- C. No charge
- D. Neutral

The electric charge of an electron is negative. This fundamental characteristic of the electron is critical in the study of physics, as it is one of the basic building blocks of matter. The negative charge of the electron plays a significant role in the electromagnetic force, which is one of the four fundamental forces in nature. Electrons are subatomic particles that orbit the nucleus of an atom and possess a relatively small mass compared to protons and neutrons, which have a positive charge and a neutral charge, respectively. Understanding the negative charge of the electron helps in grasping concepts such as electric currents, conductivity, and chemical bonding, where the balance of positive and negative charges determines the behavior of atoms and molecules. The distinction between negative, positive, and neutral charges underpins much of the theory behind electrical interactions and is essential in various applications, including radiology, where the interactions between charged particles and electromagnetic fields are significant.

5. Which feature is NOT a function of the anode in an x-ray tube?

- A. Thermal conductor
- B. Mechanical support
- C. Electrical insulator**
- D. Electrical conductor

The function of the anode in an x-ray tube primarily involves supporting the rotating mechanism, acting as a thermal conductor to dissipate heat generated during x-ray production, and serving as an electrical conductor to facilitate the flow of electrons. Mechanical support is essential because the anode needs to be robust enough to withstand the rotational forces during operation and provide stability to the x-ray tube. Thermal conduction is crucial since the process of x-ray production generates significant heat, and the anode helps transfer that heat away from the source to maintain optimal performance and prevent damage to the components. Electrical conduction is also a key aspect of the anode's design, as it must effectively carry electrons from the cathode to facilitate the x-ray production process when high-voltage is applied. The function of being an electrical insulator, however, does not align with the role of the anode. Insulation is necessary for parts of the x-ray tube that need to prevent the flow of electricity where it is not wanted, such as around the tube housing or areas that require separation of conductive components. Thus, the correct choice relates to a feature that is fundamentally outside the intended functions of the anode in its role in an x-ray tube.

6. What is the maximum number of electrons that can occupy the L shell?

- A. 2
- B. 8**
- C. 18
- D. 32

The maximum number of electrons that can occupy a given electron shell is determined by the formula $2n^2$, where n represents the principal quantum number of that shell. The L shell corresponds to $n = 2$. By using the formula: $2n^2 = 2(2^2) = 2 \times 4 = 8$. Thus, the maximum number of electrons that can occupy the L shell is 8. This matches the structure of electron shells, where the first shell can hold up to 2 electrons, the second shell (L shell) can hold up to 8 electrons, and the third shell can hold up to 18 electrons, following the increasing capacity with principal quantum number. Understanding this electronic configuration is essential for grasping concepts related to chemical bonding, ionization, and the overall behavior of atoms in various states, making it a key fundamental concept in radiology physics and other sciences.

7. Which side of the x-ray beam is more intense due to the heel effect?

- A. Anode
- B. Cathode**
- C. Central ray
- D. Periphery

The heel effect is an important phenomenon in radiology that describes the variation in x-ray intensity across the beam. In an x-ray tube, the cathode side is where the x-ray tube filament is located, and it emits electrons that produce x-rays when they strike the target. The anode side, opposite the cathode, is where the x-rays are emitted. When x-rays are generated, they have their highest intensity on the cathode side. This is primarily due to the geometric positioning of the beams as they pass through the anode. The heel of the anode absorbs some of the x-rays, leading to a decrease in intensity on that side. Consequently, there is a greater intensity of x-rays on the cathode side compared to the anode side. This uneven distribution of x-ray intensity means that the side closest to the cathode will produce images with denser or more penetrating x-rays, while the area near the anode may show less intensity and detail due to its slightly lower energy output and absorption effects. Understanding the heel effect is crucial for practitioners, as it influences how radiographs are taken and can determine the placement of the x-ray beam relative to the anatomy being imaged for optimal results.

8. What is one of the benefits of using a rotating anode?

- A. Higher tube currents**
- B. Increased film density
- C. Longer exposure times
- D. Lower contrast

Using a rotating anode provides the benefit of higher tube currents, which directly relates to the efficiency and effectiveness of x-ray production. The rotating anode spreads out the heat generated during high tube currents over a larger surface area, allowing for the use of higher exposure factors without damaging the anode. This ability to handle higher tube currents means that more electrons can be accelerated and collided with the target material, resulting in increased x-ray production per unit time. Consequently, this boosts the overall efficiency of the x-ray tube and improves the quality of images by allowing for shorter exposure times and reduced motion blur. The other options do not accurately reflect the primary advantages of using a rotating anode. Increased film density and lower contrast are more influenced by factors such as kVp and exposure time, while longer exposure times would generally not be desirable, as they can introduce motion artifacts and increase the patient's dose unnecessarily.

9. What is the minimum source to skin distance required for mobile fluoroscopy units?

- A. 10 inches
- B. 12 inches**
- C. 15 inches
- D. 20 inches

The minimum source to skin distance (SSD) for mobile fluoroscopy units is established to minimize the radiation exposure to patients and healthcare providers. The correct answer, which specifies 12 inches, is significant because it is in line with safety standards established by organizations like the American College of Radiology (ACR) and the Radiological Society of North America (RSNA). A minimum SSD of 12 inches reduces the intensity of scattered radiation that can impact both the patient and the personnel in the room. This distance is crucial as it ensures that the amount of radiation the skin surfaces receive is at a safer level, helping to prevent potential adverse effects, such as skin burns or damage, that can occur with higher doses. The other options, though varying in distance, either exceed or do not meet the standard recommended threshold for source to skin distance in mobile fluoroscopy, which emphasizes the importance of adhering to these guidelines for safety purposes. Therefore, maintaining at least 12 inches as the SSD is critical in clinical practice, ensuring the protection of all individuals involved during the procedure.

10. What is the primary advantage of digital radiography over film-based radiography?

- A. Immediate image availability and the ability to manipulate images digitally**
- B. Lower cost of materials used
- C. More detailed images with higher resolution
- D. Less energy required for image production

The primary advantage of digital radiography lies in its immediate image availability and the ability to manipulate images digitally. In digital radiography, images are captured electronically and can be displayed almost instantaneously on a computer screen. This rapid availability facilitates quicker diagnosis and treatment decisions, which is a significant benefit over traditional film-based systems where developing time can delay patient care. Moreover, the digital images can be enhanced or manipulated using software, allowing radiologists to adjust contrast, brightness, and zoom in on areas of interest without needing to re-expose the patient. This flexibility helps improve the diagnostic quality of images, enabling better visualization of anatomical structures and pathologies. While other options present some aspects of digital radiography, they do not encapsulate the main advantage as effectively as the immediacy and manipulability of digital images. For instance, while digital systems may lead to cost savings over the long term, especially in terms of not needing to purchase film and chemicals, the immediate access to images and digital manipulation is more central to the overall advantage of transitioning from film to digital. Similarly, although digital radiography can offer higher resolution capabilities, the defining characteristic that revolutionizes the workflow in clinical settings is primarily its immediate image availability and digital manipulation capabilities.

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://radiologyphysics.examzify.com>

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

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