

RTBC Fundamentals of Digital Radiography Practice Test (Sample)

Study Guide



Everything you need from our exam experts!

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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. In digital radiography, what is the primary purpose of a look-up table (LUT)?**
 - A. Maps raw detector values to display grayscale to optimize contrast and brightness for diagnostic viewing.**
 - B. Adjusts the histogram to equalize the brightness across the image.**
 - C. Determines the grid ratio needed for scatter control.**
 - D. Stores patient demographic information for the study.**

- 2. What is the purpose of the laser within the CR digitizer?**
 - A. release the latent image from the PSP layer**
 - B. release the latent image from the conductor layer**
 - C. erase the latent image from the PSP layer**
 - D. erase the latent image from the conductor layer**

- 3. When should a CR IP be processed to prevent loss of the latent image?**
 - A. as soon after the exposure as possible**
 - B. 3 min after the exposure**
 - C. 5 min after the exposure**
 - D. 7 min after the exposure**

- 4. List two essential components of a DR QA program and briefly describe their purpose.**
 - A. Detector performance checks; exposure index/algorithm validation**
 - B. Patient positioning; room temperature**
 - C. Film density; chemical processing**
 - D. User training; software licensing**

- 5. Which interaction is responsible for x-ray absorption in the phosphor layer of a CR plate, among the listed options?**
 - A. Compton**
 - B. Photoelectric**
 - C. Characteristic**
 - D. Classical**

- 6. Which approach to increasing the signal may lead to an increase in scatter reaching the image receptor?**
- A. Increasing mAs**
 - B. Increasing kVp**
 - C. Increasing Grid Ratio**
 - D. Increasing SID**
- 7. Processing a tib-fib radiograph as an abdomen may result in which of the following?**
- A. Excessive patient dose**
 - B. Loss of spatial resolution**
 - C. Incorrect brightness and contrast**
 - D. Reduced dynamic range**
- 8. What best describes the dynamic range of a digital radiography detector?**
- A. The detector's spatial resolution**
 - B. The grayscale bit-depth**
 - C. The span of exposures the detector can accurately convert to digital values**
 - D. The frame rate of image acquisition**
- 9. Which of the following components is not utilized for CR systems?**
- A. IP reader/digitizer**
 - B. IP**
 - C. developer**
 - D. protective layer**
- 10. Aliasing in DR imaging and how can it be prevented?**
- A. Aliasing Occurs When Sampling Frequency Is Insufficient to Represent High-Frequency Structures; Prevent With Appropriate Sampling, Higher Grid Frequency, and Proper Alignment**
 - B. Aliasing Is Not Preventable**
 - C. Aliasing Occurs Due to Patient Motion**
 - D. Aliasing Is a Type of Random Noise From the Detector**

Answers

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

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Explanations

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1. In digital radiography, what is the primary purpose of a look-up table (LUT)?

A. Maps raw detector values to display grayscale to optimize contrast and brightness for diagnostic viewing.

B. Adjusts the histogram to equalize the brightness across the image.

C. Determines the grid ratio needed for scatter control.

D. Stores patient demographic information for the study.

In digital radiography, the look-up table maps each raw detector value to a display gray level, shaping the image's contrast and brightness for diagnostic viewing. The raw data span a wide dynamic range, and the LUT converts those values into the grayscale scale our monitors display, often using a gamma-like or custom curve to emphasize clinically important differences in tissues. This helps make details more visible and provides a consistent appearance across images and systems. Histograms and brightness distribution are managed by other processing steps, which is why histogram equalization isn't the primary function of the LUT. Grid ratio and scatter control are about acquisition hardware and technique, not the display mapping. Patient demographics belong to metadata, not image processing.

2. What is the purpose of the laser within the CR digitizer?

A. release the latent image from the PSP layer

B. release the latent image from the conductor layer

C. erase the latent image from the PSP layer

D. erase the latent image from the conductor layer

The laser in a CR digitizer is used to read the stored image information by stimulating the phosphor layer. After x-ray exposure, the phosphor storage layer traps some electrons, creating a latent image within that layer. The laser scans the plate and causes those trapped electrons to release their stored energy as light (stimulated luminescence). This emitted light is detected and converted into a digital signal that forms the image. The latent image is in the PSP layer, not the conductor layer, and the laser's role is reading it, not erasing it. Erasure happens afterward with bright light to reset the plate for the next use.

3. When should a CR IP be processed to prevent loss of the latent image?

A. as soon after the exposure as possible

B. 3 min after the exposure

C. 5 min after the exposure

D. 7 min after the exposure

In CR, the latent image is stored in the phosphor as trapped electrons after exposure. Those trapped electrons can fade away over time due to thermal energy, so the signal gets weaker if the plate isn't read promptly. Reading and processing the plate as soon after exposure as possible preserves the stored information and yields the best image density and contrast. Any delay—even a few minutes—allows more fading, which can reduce image quality. That's why processing immediately is the preferred practice.

4. List two essential components of a DR QA program and briefly describe their purpose.

A. Detector performance checks; exposure index/algorithm validation

B. Patient positioning; room temperature

C. Film density; chemical processing

D. User training; software licensing

In DR QA, two essential components focus on ensuring reliable image quality and accurate dose information. Detector performance checks verify the health of the digital detector itself—its uniform response across the imaging area, acceptable dark noise, minimal lag, and absence of defective pixels—so images are true to anatomy and free from artifacts that could hide pathologies. This kind of testing keeps image quality consistent over time and across different exams. Exposure index validation with the processing algorithms ensures that the system's exposure indicators accurately reflect the patient's dose and that the image processing chain (including histogram handling and LUT mapping) produces consistent brightness and contrast for comparable exposures. This supports dose tracking, benchmarking, and reliable image appearance regardless of slight variations in technique. While factors like patient positioning or environmental conditions affect workflow and comfort, they don't directly ensure image quality or dose indication in a DR QA program. Film-related issues and licensing or training, though important in broader operations, aren't the two core DR QA components.

5. Which interaction is responsible for x-ray absorption in the phosphor layer of a CR plate, among the listed options?

A. Compton

B. Photoelectric

C. Characteristic

D. Classical

Absorption in the CR phosphor layer at diagnostic x-ray energies occurs mainly through the photoelectric effect. In high-Z phosphor materials, an incident x-ray can eject a tightly bound inner-shell electron, and the energy released when that vacancy is filled produces electron-hole excitations that the europium activator converts into visible light. This absorption pathway is efficient in this energy range, so the deposited energy forms the latent image where x-rays hit. Compton scattering, by contrast, mostly involves photons being scattered and transferring only part of their energy to recoil electrons, so it contributes to scatter and fog rather than the stored energy needed for luminescence. Characteristic interactions happen after inner-shell ionization and emit secondary x-rays; they are a follow-up effect, not the primary mechanism generating the stored energy. Classical isn't a recognized interaction in this context.

6. Which approach to increasing the signal may lead to an increase in scatter reaching the image receptor?

- A. Increasing mAs**
- B. Increasing kVp**
- C. Increasing Grid Ratio**
- D. Increasing SID**

Raising the beam energy (kVp) increases the energy of the photons, which makes Compton scattering more likely inside the patient. Those scatter photons travel in many directions and some reach the image receptor, adding to the signal while also degrading image contrast. So this approach can boost receptor exposure but also increases the scatter reaching the receptor. Increasing mAs would raise the total number of photons and thus the signal, but the change is not primarily about increasing scatter via energy. Increasing grid ratio absorbs more scatter before it reaches the receptor, and increasing SID reduces scatter and primary exposure at the receptor due to the inverse-square effect.

7. Processing a tib-fib radiograph as an abdomen may result in which of the following?

- A. Excessive patient dose**
- B. Loss of spatial resolution**
- C. Incorrect brightness and contrast**
- D. Reduced dynamic range**

Processing a tib-fib radiograph with settings intended for the abdomen uses a different grayscale mapping (window/level and look-up table) than what bone and tibial soft tissues require. The abdomen is optimized to show soft tissues and organs, while a tib-fib exam relies on clearly differentiating dense bone from soft tissue. When the wrong processing is applied, the grayscale mapping makes the bone and surrounding tissues appear with the wrong brightness and contrast, so the image can be diagnostically misleading. In short, the misapplication results in incorrect brightness and contrast, which is why that choice is best.

- 8. What best describes the dynamic range of a digital radiography detector?**
- A. The detector's spatial resolution**
 - B. The grayscale bit-depth**
 - C. The span of exposures the detector can accurately convert to digital values**
 - D. The frame rate of image acquisition**

Dynamic range describes how much exposure a digital radiography detector can handle and still produce a usable digital signal. It spans from the smallest signal that can be distinguished from noise up to the largest signal at which the detector begins to saturate. A wide dynamic range means the detector can accurately convert both very low and very high exposures, preserving detail across a range of tissues and patient sizes without losing information in shadows or highlights. This concept is about the detector's exposure-to-digital value conversion across different scene brightness, not about how finely image details are sampled (spatial resolution), how many gray levels a image can show for contrast once recorded (grayscale bit-depth), or how fast images can be acquired (frame rate).

- 9. Which of the following components is not utilized for CR systems?**
- A. IP reader/digitizer**
 - B. IP**
 - C. developer**
 - D. protective layer**

In computed radiography, imaging relies on a reusable plate—the IP—that stores the x-ray energy in its phosphor layer. After exposure, the plate goes into a CR reader where a laser scans it and the stored energy is released as light. This light is detected and converted into a digital image. There is no chemical processing step in CR; unlike traditional film-screen radiography, which uses a chemical developer to create the visible image, CR relies on electronic reading and digitization. The IP reader/digitizer is the device that converts the plate's signal into a digital image, the IP is the plate itself, and the protective layer is part of that plate's construction to protect the phosphor layer. Therefore, the component not used in CR systems is the developer.

10. Aliasing in DR imaging and how can it be prevented?

A. Aliasing Occurs When Sampling Frequency Is Insufficient to Represent High-Frequency Structures; Prevent With Appropriate Sampling, Higher Grid Frequency, and Proper Alignment

B. Aliasing Is Not Preventable

C. Aliasing Occurs Due to Patient Motion

D. Aliasing Is a Type of Random Noise From the Detector

Aliasing occurs when the detector's sampling rate isn't high enough to capture the finest details in the image. In digital radiography, the image is sampled into discrete pixels; if some structures have spatial frequencies higher than half of that sampling rate (the Nyquist limit), those details fold back and distort the image. Preventing this relies on increasing sampling capability—smaller pixel size or a higher-resolution detector—and using a grid with higher line density. Proper alignment of the grid with the detector also helps, so the grid's pattern doesn't interact with the sampling in a way that produces moiré or aliasing artifacts. Aliasing is not primarily caused by motion or by random detector noise; those issues are separate concerns.

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://rtbcfundofdigitalrad.examzify.com>

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

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