# RTBC Fundamentals of Digital Radiography Practice Test (Sample)

**Study Guide**



BY EXAMZIFY

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

1. **When radiographic grids are used to reduce scatter, which adjustment is typically preferred?**

   A. increase mAs

   B. increase kVp

   C. decrease mAs

   D. decrease kVp

2. **MTF is also referred to as which of the following?**

   A. image fidelity

   B. detective quantum efficiency

   C. tube potential

   D. image orientation

3. **Within a digital radiography matrix, what does 1024 x 1024 refer to in imaging terms?**

   A. The number of pixels in the matrix

   B. The size of pixels in the matrix

   C. The number of brightness levels displayed in the matrix

   D. The physical measurement of the matrix

4. **Which of the following would decrease the DQE?**

   A. Decreased spatial frequency

   B. Increasing kVp

   C. Increasing capture efficiency

   D. Decreasing kVp

5. **How many shades of gray can be displayed by an 8-bit digital radiography system?**

   A. 8 Shades

   B. 64 Shades

   C. 256 Shades

   D. 1024 Shades

6. **Which MTF score indicates that an image perfectly represents the object in both spatial resolution and contrast?**

   A. 0

   B. 0.1

   C. 0.5

   D. 1.0

7. **Which configuration will yield the highest spatial resolution?**

   A. Large Matrix High Pitch

   B. Large Matrix Low Pitch

   C. Small Matrix Low Pitch

   D. Small Matrix High Pitch

8. **Which bit depth enables the greatest amount of anatomical information to be displayed in a digital radiography image?**

   A. 12-bit

   B. 8-bit

   C. 4-bit

   D. 2-bit

9. **The latent image concept in computed radiography describes which of the following?**

   A. release of energy from the fluorohalides

   B. stored energy within the fluorohalides

   C. number of x-ray photons leaving the patient

   D. interactions of x-ray photons within the IP

10. **Which factor most directly controls the brightness levels displayed in a digital radiography image?**

    A. Matrix size

    B. Bit depth

    C. Exposure time

    D. Focal spot size

# **Answers**

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

# Explanations

## 1. When radiographic grids are used to reduce scatter, which adjustment is typically preferred?

**A. increase mAs**

**B. increase kVp**

**C. decrease mAs**

**D. decrease kVp**

When a grid is used, scatter is reduced but the primary beam is attenuated, so fewer photons reach the image receptor. To keep receptor exposure and image density consistent, the usual approach is to increase the mAs. This boosts the number of photons in the beam, offsetting the grid's absorption without degrading image contrast as increasing kVp might. Decreasing mAs would underexpose the image, and increasing kVp would raise penetration and scatter in a way that can lessen image quality and counter the grid's benefits.

## 2. MTF is also referred to as which of the following?

**A. image fidelity**

**B. detective quantum efficiency**

**C. tube potential**

**D. image orientation**

Understanding how MTF describes the system's ability to reproduce detail across spatial frequencies is what this question tests. Modulation Transfer Function quantifies how well the imaging system preserves contrast at different levels of detail as information moves from the object to the image. In other words, it measures how faithfully the image reflects the original scene, especially for fine patterns and edges. A higher MTF means sharper edges and better preservation of fine details, which is why this concept is described as image fidelity. This differs from other terms: detective quantum efficiency (DQE) relates to how efficiently the system converts incident photons into usable signal while accounting for noise, not the fidelity of detail transfer. Tube potential refers to the energy setting of the x-ray beam, affecting penetration and contrast but not the fidelity of detail transfer per se. Image orientation is about the positioning or direction of the image data, not the transfer of contrast at varying spatial frequencies. So, Modulation Transfer Function is best described as image fidelity.

## 3. Within a digital radiography matrix, what does 1024 x 1024 refer to in imaging terms?

**A. The number of pixels in the matrix**

**B. The size of pixels in the matrix**

**C. The number of brightness levels displayed in the matrix**

**D. The physical measurement of the matrix**

In a digital radiography matrix, 1024 x 1024 refers to the grid size—the number of sampling points in each dimension. It means there are 1024 pixels across and 1024 pixels down, for a total of 1,048,576 pixels in the image. This tells you how finely the image is sampled, not how bright each pixel is or how large the pixels physically are. Pixel size (pitch) depends on the field of view and the matrix dimensions, while the number of brightness levels depends on the bit depth (how many gray shades the system can display). So this specification is about the count of pixels in the matrix, not brightness levels or physical dimensions.

## 4. Which of the following would decrease the DQE?

A. Decreased spatial frequency

**B. Increasing kVp**

C. Increasing capture efficiency

D. Decreasing kVp

DQE measures how efficiently a detector converts incoming x-ray quanta into a usable image signal while preserving detail and keeping noise low. It depends on how many photons the detector actually captures and how faithfully those captured photons are turned into image information, across spatial frequencies. Raising kVp shifts the x-ray spectrum toward higher-energy photons. These photons interact with detector material less readily, so fewer incident quanta are absorbed and converted into signal for the same dose. At the same time, the relative noise can increase because the signal per photon is smaller, leading to a lower DQE. In contrast, decreasing kVp increases absorption and tends to improve DQE. Increasing capture efficiency directly increases DQE since more of the incident photons contribute to the signal. Decreasing spatial frequency usually does not cause a decrease in DQE; in fact, DQE typically declines with increasing spatial frequency, so lower frequencies are less demanding on the detector.

## 5. How many shades of gray can be displayed by an 8-bit digital radiography system?

A. 8 Shades

B. 64 Shades

**C. 256 Shades**

D. 1024 Shades

Bit depth determines how many grayscale values a pixel can represent. Each additional bit doubles the number of possible gray values, since every bit adds a binary choice. With eight bits, you have two to the eighth power possible grayscale values, which is two hundred fifty-six distinct shades from black to white. This range provides fine gradations to separate subtle tissue differences and avoids abrupt transitions, improving contrast resolution compared with lower-bit systems.

## 6. Which MTF score indicates that an image perfectly represents the object in both spatial resolution and contrast?

A. 0

B. 0.1

C. 0.5

**D. 1.0**

MTF measures how faithfully an imaging system preserves the contrast of the object at a given level of detail. It can range from no transfer to perfect transfer. The best, most accurate reproduction of both spatial detail and contrast happens when the transfer is at its maximum value, meaning all modulation is preserved from object to image. Any lower value means some blur or loss of contrast for that detail, so the image wouldn't perfectly represent the object. In short, a perfect representation corresponds to the maximum possible MTF value, even though real systems never reach that ideal everywhere.

## 7. Which configuration will yield the highest spatial resolution?

A. Large Matrix High Pitch

**B. Large Matrix Low Pitch**

C. Small Matrix Low Pitch

D. Small Matrix High Pitch

Spatial resolution improves when the image is sampled more finely. This comes down to pixel size (pitch) and how many samples cover the field of view (matrix size). A smaller pitch means tinier pixels, so details smaller than a larger pixel can be distinguished. A larger matrix increases the number of samples across the image, which also boosts the ability to represent fine detail. Combining both ideas, a large matrix with a small pitch gives the most and finest sampling across the image, yielding the highest spatial resolution. If the pitch is large, pixel size is bigger and details blur; if the matrix is small, there are fewer samples across the field, which limits resolution despite pitch. So the configuration with a large matrix and low pitch provides the best resolution.

## 8. Which bit depth enables the greatest amount of anatomical information to be displayed in a digital radiography image?

**A. 12-bit**

B. 8-bit

C. 4-bit

D. 2-bit

Bit depth determines how many shades of gray the image can encode, so more bits mean finer tonal resolution. This lets you distinguish subtler differences in tissue density and edges, which is essential for identifying anatomy and potential pathology. Among the options, 12-bit supports up to 4096 gray levels, far more than 8-bit (256), 4-bit (16), or 2-bit (4). That extra range provides greater detail and less banding, and it preserves more information for post-processing adjustments, improving diagnostic visibility.

## 9. The latent image concept in computed radiography describes which of the following?

A. release of energy from the fluorohalides

**B. stored energy within the fluorohalides**

C. number of x-ray photons leaving the patient

D. interactions of x-ray photons within the IP

The latent image is the stored energy inside the phosphor crystals after x-ray exposure. In computed radiography, the imaging plate uses photostimulable phosphors (often europium-doped barium fluorohalide). When x-rays interact with these crystals, electrons become trapped in metastable states, creating a pattern that corresponds to the x-ray attenuation but remains invisible—the latent image. This energy stays stored until the plate is read, at which point a laser stimulates the trapped electrons to release their energy as light, producing the digital image. So the latent image concept centers on energy that is stored within the fluorohalide phosphors, not on energy release during reading or the immediate count of photons or initial interactions.

## 10. Which factor most directly controls the brightness levels displayed in a digital radiography image?

A. Matrix size

**B. Bit depth**

C. Exposure time

D. Focal spot size

Brightness levels on a digital radiography image are determined by how many gray shades the system can represent. That capacity is defined by bit depth. More bits per pixel mean more possible gray values (for example, 8-bit gives 256 levels, 12-bit gives 4096), allowing finer gradations and smoother transitions in brightness across the image. The display brightness you see is a result of mapping those gray values to luminance, often adjusted further by window level/width, but the fundamental limit on how many distinct brightness levels you can show comes from the bit depth. Matrix size affects spatial detail rather than how many brightness steps are available. Exposure time changes how much radiation reaches the detector, which can influence overall image brightness in a practical sense, but the direct control over the number of brightness levels remains with bit depth. Focal spot size influences sharpness and resolution, not the brightness range.

# 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!