HESI RADIOLOGIC TECHNOLOGIST PRACTICE EXAM (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

1. What is the formula for magnification factor?

A. MF = SID/SOD

B. MF = SOD/SID

C. MF = SID - SOD

D. MF = SID + SOD

2. A feature size of 0.1 mm requires a spatial resolution of at least

A. 2 lp/mm

B. 5 lp/mm

C. 10 lp/mm

D. 1 lp/mm

3. What does NCRP stand for?

A. National Council on Radiation Protection and Measurements

B. National Committee on Radiation Protection and Measurements

C. National Commission on Radiation Protection

D. National Center for Radiation Protection

4. The filament is made of _____.

A. Copper

B. Molybdenum

C. Tungsten

D. Nickel

5. Which if the following refers to the ability of the imaging system to preserve signal contrast as a function of spatial resolution?

A. SNR

B. DQE

C. Linearity

D. MTF

6. How often should the exposure timer be measured for accuracy in radiography equipment?

A. monthly

B. weekly

C. annually

D. daily

7. A ghost image can occur in digital imaging because of _____.

A. incomplete erasure

B. poor patient positioning

C. high exposure

D. low contrast

8. What type of grid error is characterized by decreased density on both sides of the image?

A. Off-center grid alignment

B. Misplaced grid

C. Upside down grid

D. Focus error

9. Which two factors are needed to use the Inverse Square Law?

A. Distance and Intensity

B. Distance and Speed

C. Time and Distance

D. Intensity and Energy

10. The air gap technique is achieved by placing the patient 10-15 cm away from the image receptor to reduce scatter radiation at the IR. Which technique reduces scatter radiation reaching the image receptor by increasing the distance between the patient and the image receptor by 10-15 cm?

A. Air gap technique

B. Grid technique

C. Bucky technique

D. Scan technique

Answers

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

Explanations

1. What is the formula for magnification factor?

A. MF = SID/SOD

B. MF = SOD/SID

C. MF = SID - SOD

D. MF = SID + SOD

Magnification factor is the ratio of how big the image appears to the actual object. This comes from similar-triangle geometry: the rays from the X-ray source pass through the object and project onto the image receptor. The scale of that projection is set by the distances from the source to the image receptor (SID) and from the source to the object (SOD). Therefore, image size = object size × (SID / SOD), so the magnification factor is MF = SID / SOD.   A numerical example helps: if the object is 5 cm tall, SID is 100 cm, and SOD is 90 cm, then MF = 100/90 ≈ 1.11, and the image is about 5.56 cm tall. If you increase SID to 120 cm while the object distance increases accordingly to keep the same OID, MF becomes 120/110 ≈ 1.09, slightly reducing magnification.   So the correct relationship uses SID divided by SOD, not the reciprocal, and it reflects how the scene scales with the geometry of the setup.

2. A feature size of 0.1 mm requires a spatial resolution of at least

A. 2 lp/mm

B. 5 lp/mm

C. 10 lp/mm

D. 1 lp/mm

Spatial resolution in lp/mm tells you how many line pairs fit into one millimeter. To resolve a feature that is 0.1 mm wide, you need the smallest line or space to be no wider than 0.1 mm. The width of a single line (or space) is 1/(2R) mm, where R is the resolution in lp/mm. Setting 1/(2R) ≤ 0.1 mm gives R ≥ 5. Thus at least 5 lp/mm is required. With 2 lp/mm, the smallest resolvable feature would be about 0.25 mm for a line and 0.125 mm for a line, which is too large for a 0.1 mm feature; 10 lp/mm would also resolve it, but 5 lp/mm is the minimum that meets the requirement.

3. What does NCRP stand for?

A. National Council on Radiation Protection and Measurements

B. National Committee on Radiation Protection and Measurements

C. National Commission on Radiation Protection

D. National Center for Radiation Protection

This question tests your recall of what NCRP stands for in radiation protection context. NCRP stands for National Council on Radiation Protection and Measurements. The word Council indicates a formal group of experts that provides guidance, not a regulatory body; Protection and Measurements reflect its focus on reducing radiation risk and on quantifying exposure and dose. The NCRP is a U.S. nonprofit organization whose reports shape safety practices, shielding design, and dose recommendations that regulators and healthcare facilities rely on. The other phrasing would imply different kinds of bodies (committee, commission, or center), but the established name is National Council on Radiation Protection and Measurements.

4. The filament is made of _____.

A. Copper

B. Molybdenum

C. Tungsten

D. Nickel

The main idea is choosing a filament material that can withstand the extreme heat needed to emit electrons continuously without melting, while also emitting electrons efficiently. In an x ray tube, the filament must be heated to incandescence to produce a steady cloud of electrons (thermionic emission). This requires a metal with a very high melting point so it won't vaporize or deform under the intense heat. Tungsten fits this requirement best, with a melting point around 3422°C, allowing it to glow and emit electrons reliably. Its high atomic number also helps make electron emission efficient, and tungesten filaments are often alloyed (for example, thorium-impregnated tungsten) to further enhance emission. The other metals don't hold up under the same heat well: copper melts far too low for sustained heating, nickel has a lower melting point, and molybdenum, though heat resistant, doesn't match tungsten's combination of melting point and emission efficiency. That's why tungsten is the material used for the filament.

5. Which if the following refers to the ability of the imaging system to preserve signal contrast as a function of spatial resolution?

A. SNR

B. DQE

C. Linearity

D. MTF

The key idea is the Modulation Transfer Function (MTF). It describes how well an imaging system preserves contrast at different spatial details, i.e., as you look at finer and finer patterns (higher spatial frequencies). If you input a pattern with a certain contrast, the MTF tells you what fraction of that contrast appears in the image at each spatial frequency. A system with high MTF maintains more of the original contrast for fine details, while an MTF that drops off quickly shows that high-frequency details are blurred and low-contrast features are lost as resolution increases. The MTF is linked to the system's blur characteristics, and it can be derived from the point-spread function or line-spread function. In contrast, SNR measures the level of signal relative to noise, DQE combines efficiency and noise performance (not specifically how contrast is preserved across spatial frequencies), and linearity concerns proportionality between input and output signals. Therefore, the ability to preserve signal contrast as a function of spatial resolution is captured by the Modulation Transfer Function.

6. How often should the exposure timer be measured for accuracy in radiography equipment?

A. monthly

B. weekly

C. annually

D. daily

Exposure timer accuracy is about ensuring the beam is on for exactly the time you set, which directly controls patient dose and image exposure. In a QA program, this is checked with calibrated measurement equipment to compare the timer's indicated time with the actual exposure time. Because such precise verification requires proper instrumentation and setup, and because timer performance tends to be stable between preventive maintenance events, the formal accuracy check is performed on a yearly basis. Daily checks verify that the system powers up and responds, but the accurate verification itself is scheduled annually unless a problem is suspected.

7. A ghost image can occur in digital imaging because of _____.

A. incomplete erasure

B. poor patient positioning

C. high exposure

D. low contrast

Ghost images in digital radiography arise when a previous exposure isn't fully cleared from the imaging plate. In computed radiography, the plate's phosphor stores energy from an exposure and releases it as a digital signal when read. After reading, the plate must undergo a complete erasure cycle with bright light to remove any residual latent image. If this erasure is incomplete, remnants from a prior study remain on the plate and reappear on the next image as a faint, ghost-like shadow in the same area. This artifact can look like a duplicate of anatomy from a prior exposure and may obscure or confuse diagnosis. To prevent it, ensure the erasure cycle is thorough, verify the processor's erasure performance, and routinely check plates and equipment for proper operation. Other factors alter image quality in different ways: poor patient positioning shifts anatomy and can cause misalignment or unintended structures; very high exposure can increase brightness or dose-related artifacts but doesn't create a ghost image from a prior study; low contrast affects visibility of structures but doesn't produce a ghost from previous images.

8. What type of grid error is characterized by decreased density on both sides of the image?

A. Off-center grid alignment

B. Misplaced grid

C. Upside down grid

D. Focus error

The concept here is grid alignment and how a grid interacts with the divergent x-ray beam. When a focused grid is placed upside down, its geometry no longer matches the beam's direction, so photons that should pass through the spaces between lead strips at the edges are increasingly blocked. This creates grid cutoff that shows up as decreased density along the image margins on both sides—the periphery becomes lighter because the primary photons are being absorbed by the lead at the edges due to the inverted orientation. Other grid problems tend to produce uneven loss—such as more cutoff on one side when the grid is off-center, or banding and periphery cutoff that depend on distance when focus is incorrect. But an upside-down grid commonly results in symmetric, peripheral density loss on both sides, which is why that option best fits the description.

9. Which two factors are needed to use the Inverse Square Law?

A. Distance and Intensity

B. Distance and Speed

C. Time and Distance

D. Intensity and Energy

The inverse square law describes how radiant intensity falls off with distance from a point source. To use it, you need two things: how far you are from the source and the intensity at that distance. The idea is that intensity is proportional to 1 divided by the distance squared, so if you know I1 at distance d1, you can find I2 at distance d2 with I2 = I1 × (d1^2 / d2^2). For example, doubling the distance cuts intensity to one quarter. This rule allows you to predict how changing distance affects exposure or illumination. The other factors listed—speed, time, energy—aren't part of this relationship, so they don't determine how intensity changes with distance.

10. The air gap technique is achieved by placing the patient 10-15 cm away from the image receptor to reduce scatter radiation at the IR. Which technique reduces scatter radiation reaching the image receptor by increasing the distance between the patient and the image receptor by 10-15 cm?

A. Air gap technique

B. Grid technique

C. Bucky technique

D. Scan technique

Focusing on how scatter is controlled through geometry shows why this technique works. Scatter photons are emitted inside the patient in many directions. When the image receptor is kept close to the patient, more of those scattered photons reach the receptor, degrading contrast. By increasing the distance between the patient and the image receptor by about 10–15 cm (the air gap), many of the scatter photons diverge away from the receptor and miss it, so image contrast improves without adding a grid between the patient and the receptor. This approach is often used when a grid isn't feasible or when avoiding grid artifacts is desirable, though it does introduce some magnification and potential loss of sharpness. In contrast, a grid physically absorbs scatter with lead strips between the patient and receptor and requires higher exposure to maintain receptor exposure. The other options refer to different grid-related techniques or equipment adjustments and do not describe increasing distance to reduce scatter.

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://hesiradtech.examzify.com

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