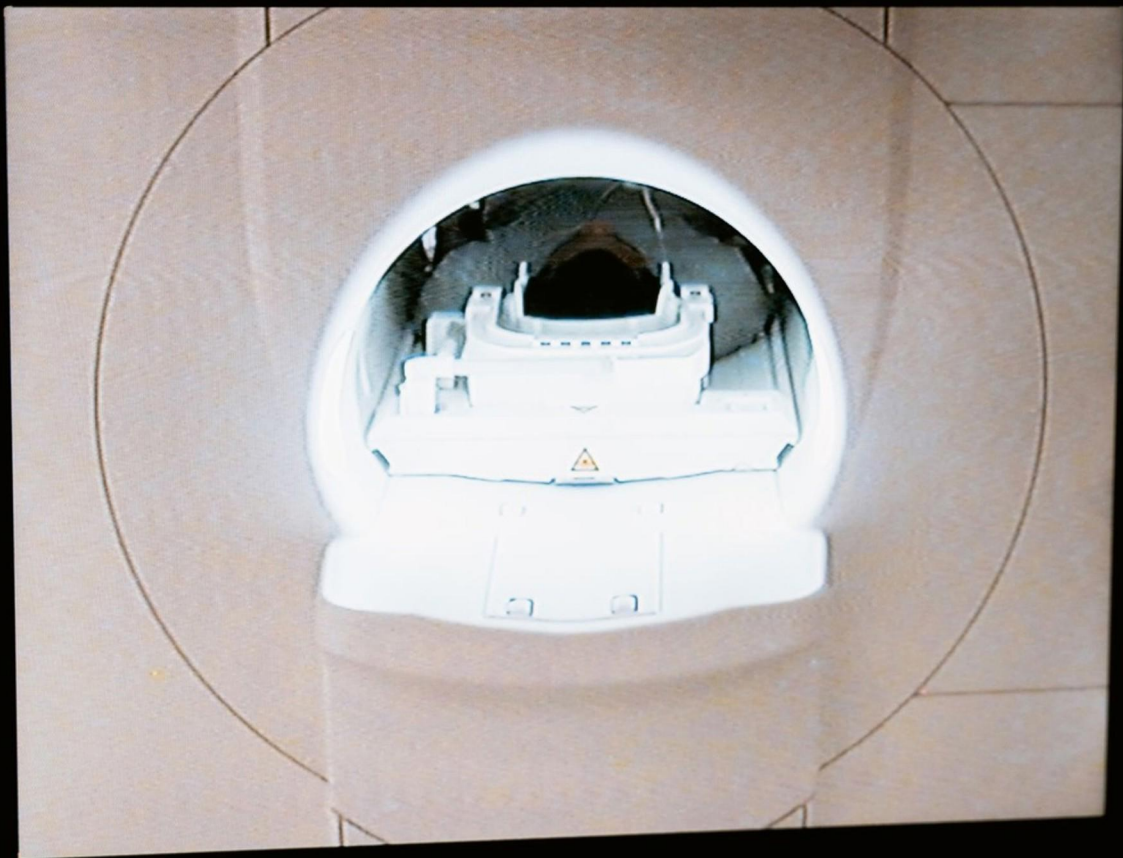


ARRT NUCLEAR MEDICINE PRACTICE TEST (SAMPLE)

STUDY GUIDE



Prepare with structure. Pass with confidence



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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 type of collimator is recommended for organ counting in a red cell sequestration study?**
 - A. Parallel-hole collimator
 - B. Converging collimator
 - C. Flat-field collimator
 - D. Fan-beam collimator
- 2. Which radiopharmaceutical is known to be light sensitive?**
 - A. Technetium-99m
 - B. Mertiatide
 - C. Gallium-67
 - D. Iodine-123
- 3. A gated equilibrium ventricular function study can be performed with which 99mTc-labeled tracers?**
 - A. Pentetate
 - B. Medronate
 - C. Pyrophosphate
 - D. Human serum albumin
- 4. In preparation for a Tl-201 stress test, why are patients instructed to fast?**
 - A. To enhance the effectiveness of the exercise
 - B. To minimize tracer uptake in the GI tract
 - C. To reduce anxiety
 - D. To prevent allergic reactions
- 5. When should geometric variation on a dose calibrator be performed?**
 - A. After daily use
 - B. At instillation and after repair
 - C. Every week
 - D. Only before calibration

- 6. What is a key advantage of Tl201 thallium chloride?**
- A. It has a high photon flux at a low-energy window
 - B. It is a calcium analog
 - C. It redistributes
 - D. It has a long half-life
- 7. According to the NRC, when can radioactive waste be delayed in storage?**
- A. If it has a physical life of less than 120 days
 - B. If it is stored in a cool environment
 - C. If it contains fewer than 10 mCi
 - D. If it is fully decayed
- 8. What is the annual dose limit for the lens of the eye for an occupational worker?**
- A. 20 mSv (2 rem)
 - B. 50 mSv (5 rem)
 - C. 75 mSv (7.5 rem)
 - D. 100 mSv (10 rem)
- 9. Which matrix size and acquisition method is best suited for a blood flow study of the feet?**
- A. 32 x 32 byte
 - B. 64 x 64 byte
 - C. 128 x 128 byte
 - D. 256 x 256 byte
- 10. A biohazard warning label must be attached to all of the following EXCEPT:**
- A. Unit of blood released for clinical use
 - B. Radioactive waste containers
 - C. Biohazardous materials
 - D. Infectious agents

Answers

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

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Explanations

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1. What type of collimator is recommended for organ counting in a red cell sequestration study?

- A. Parallel-hole collimator
- B. Converging collimator
- C. Flat-field collimator**
- D. Fan-beam collimator

In a red cell sequestration study, a flat-field collimator is particularly effective due to its design, which provides a uniform response across a large field of view. This type of collimator is specifically engineered to minimize spatial distortion and allow for more accurate quantification of radioactivity, essential for precise organ counting. When performing organ counting, linearity and uniformity of the detected signal are crucial, especially when assessing the distribution and concentration of radiolabeled red blood cells within specific organs. The flat-field collimator helps to achieve a more consistent image, resulting in improved counting accuracy for the areas of interest. In contrast, parallel-hole collimators are typically used for general imaging applications where spatial resolution is a priority but may not provide the same level of uniformity for organ counting in this context. Converging and fan-beam collimators serve specific imaging purposes—converging collimators enhance resolution but can introduce artifacts, while fan-beam collimators are better suited for tomographic imaging rather than straightforward organ counting. Therefore, the flat-field collimator's attributes make it the appropriate choice for ensuring the reliability and accuracy needed in a red cell sequestration study, focusing on measuring radioactivity from specific organ

2. Which radiopharmaceutical is known to be light sensitive?

- A. Technetium-99m
- B. Mertiatide**
- C. Gallium-67
- D. Iodine-123

Mertiatide, also known as [99mTc] MAG3, is recognized as a light-sensitive radiopharmaceutical. This characteristic means that exposure to light may degrade the compound, which could potentially affect its stability and efficacy in diagnostic imaging. Therefore, when handling mertiatide, it is important to protect it from light to ensure that it remains effective for use in procedures such as renal imaging. The other radiopharmaceuticals listed do not share this significant sensitivity to light. Technetium-99m is widely used in a variety of imaging studies, primarily because of its ideal physical properties; it is stable under normal conditions. Gallium-67 and Iodine-123, while having their own handling requirements, do not have strict light sensitivity concerns like mertiatide. Understanding the specific handling and storage requirements for different radiopharmaceuticals is crucial for maintaining their integrity and ensuring optimal diagnostic outcomes.

3. A gated equilibrium ventricular function study can be performed with which ^{99m}Tc -labeled tracers?

- A. Pentetate
- B. Medronate
- C. Pyrophosphate
- D. Human serum albumin**

In a gated equilibrium ventricular function study, the primary goal is to assess the motion and function of the heart chambers quantitatively. This type of study is often performed utilizing tracers that can provide both dynamic and equilibrium imaging of the heart. Human serum albumin labeled with technetium-99m (^{99m}Tc) is particularly beneficial in this context because it serves as a blood pool agent. It effectively outlines the heart's chambers by outlining the vascular pool and allowing for accurate assessment of parameters such as ejection fraction and wall motion. The longer retention of the albumin in the circulation enhances the quality of the images obtained during the equilibrium phase of the scan, enabling detailed evaluation of cardiac function. The other tracers listed have different applications. Pentetate is typically used for renal imaging, and while it can provide some cardiac data, it is not ideal for gated studies. Medronate, often used for bone imaging, is not suited for evaluating cardiac structures. Pyrophosphate is commonly used for detecting myocardial infarction but is not a blood pool agent, thus it does not allow for the same level of functional assessment as human serum albumin. Utilizing human serum albumin in gated equilibrium studies enhances the accuracy of cardiac function evaluations due to its

4. In preparation for a Tl-201 stress test, why are patients instructed to fast?

- A. To enhance the effectiveness of the exercise
- B. To minimize tracer uptake in the GI tract**
- C. To reduce anxiety
- D. To prevent allergic reactions

Fasting before a Tl-201 stress test is important primarily to minimize tracer uptake in the gastrointestinal (GI) tract. When a patient consumes food or drinks before the procedure, it can lead to a higher concentration of radioisotopes in the GI system, which can interfere with the imaging results. The presence of food can cause non-target areas like the stomach or intestines to absorb the tracer, potentially obscuring the cardiac images that need to be evaluated for blood flow or perfusion issues. By fasting, clinicians ensure that the tracers are more selectively taken up by the heart muscle rather than the GI system, leading to clearer and more accurate imaging results. This helps in the reliable assessment of myocardial perfusion during the stress test.

5. When should geometric variation on a dose calibrator be performed?

- A. After daily use
- B. At instillation and after repair**
- C. Every week
- D. Only before calibration

Geometric variation on a dose calibrator refers to the assessment of the calibrator's accuracy across different geometries of container or syringe where the radioactive material is housed. Performing geometric variation is essential to ensure that measurements remain accurate despite changes in geometry that can affect the attenuation of radiation. The correct timing for conducting geometric variation is at installation and after repair. When a dose calibrator is first installed, it needs to be verified to ensure that it provides accurate readings across the various geometrical configurations that may be encountered during routine use. Similarly, after any repair, the functionality and accuracy of the device could be impacted. Thus, it's crucial to perform this test to confirm that the device is properly calibrated and functioning correctly in its new or repaired state. Conducting this variation test only before calibration or after daily use does not ensure comprehensive verification of the device's performance. Regular weekly checks may maintain operational standards but do not replace the need for specific assessments after installation or repair. Therefore, testing at these critical points ensures the highest accuracy and reliability in dose measurements, which is essential in nuclear medicine for patient safety and effective treatment.

6. What is a key advantage of Tl201 thallium chloride?

- A. It has a high photon flux at a low-energy window
- B. It is a calcium analog
- C. It redistributes**
- D. It has a long half-life

The key advantage of Tl201 thallium chloride is that it redistributes within myocardial tissue, which is crucial for assessing myocardial perfusion. When administered, Tl201 behaves similarly to potassium and is taken up by viable myocardial cells. After initial uptake, the distribution of Tl201 changes over time as the radioactive material flows into areas of the heart with better blood supply and away from areas with reduced perfusion or damage. This characteristic is particularly valuable during stress testing, allowing for a more accurate determination of how well blood flows through the heart muscle under different conditions. In contrast, while factors like high photon flux, calcium analog properties, and half-life can influence the practicality of a radiopharmaceutical, they do not encompass the dynamic physiological process that occurs when using Tl201 for imaging. The ability to visualize areas with altered blood flow due to their redistribution helps clinicians to better diagnose and manage cardiac conditions.

7. According to the NRC, when can radioactive waste be delayed in storage?

A. If it has a physical life of less than 120 days

B. If it is stored in a cool environment

C. If it contains fewer than 10 mCi

D. If it is fully decayed

The correct answer is based on the NRC's regulations regarding the management of radioactive waste. Specifically, radioactive waste that has a physical half-life of less than 120 days can be delayed in storage because it typically decays quickly enough that it will not pose a long-term risk. This allows for a more efficient handling process, as shorter-lived isotopes can be stored temporarily while they decay to safer levels. The regulation is designed to balance safety with practical management of waste. In contrast, factors such as environmental storage conditions or the total activity of the waste (like mCi levels) do not influence the regulations governing how and when storage can be delayed. Additionally, while ensuring that waste is fully decayed before disposal is essential for safety, it does not directly relate to delay in storage regulations outlined by the NRC. Hence, the focus on the half-life of the material is crucial to understanding the guidelines for radioactive waste management.

8. What is the annual dose limit for the lens of the eye for an occupational worker?

A. 20 mSv (2 rem)

B. 50 mSv (5 rem)

C. 75 mSv (7.5 rem)

D. 100 mSv (10 rem)

The annual dose limit for the lens of the eye for an occupational worker is set at 50 mSv (5 rem). This limit is established by radiation protection guidelines to help prevent radiation-induced cataracts, which are a significant risk associated with high doses of ionizing radiation to the eye. The rationale for this specific limit is based on scientific studies that have demonstrated a correlation between radiation exposure to the lens and the occurrence of cataracts. Regulatory agencies, such as the International Commission on Radiological Protection (ICRP) and the U.S. Nuclear Regulatory Commission (NRC), have established this limit to provide a balance between allowing workers to perform their duties while minimizing risks to their health. In contrast, other dose limits for various body parts and the whole body are different. Knowing these distinctions is crucial for professionals in the field to ensure they adhere to safety protocols and protect themselves from potential long-term effects of radiation exposure.

9. Which matrix size and acquisition method is best suited for a blood flow study of the feet?

- A. 32 x 32 byte
- B. 64 x 64 byte**
- C. 128 x 128 byte
- D. 256 x 256 byte

The selection of matrix size and acquisition method is crucial in nuclear medicine imaging, especially for procedures like blood flow studies in the feet where detail and resolution are important. A 64 x 64 matrix strikes an optimal balance for this type of study. This matrix size offers sufficient resolution to visualize vascular structures without creating excessively large files or demanding longer acquisition times, which could lead to motion artifacts or patient discomfort. In nuclear medicine, a higher matrix size typically increases the resolution but may require longer acquisition times and produce larger image files. In contrast, a smaller matrix may not capture fine details effectively, potentially leading to a loss of important diagnostic information. The 64 x 64 matrix is generally recognized as a standard for many clinical imaging scenarios, providing a good mix of resolution and efficiency, particularly when examining smaller anatomical regions like the feet, where clear visualization of blood flow is essential.

10. A biohazard warning label must be attached to all of the following EXCEPT:

- A. Unit of blood released for clinical use**
- B. Radioactive waste containers
- C. Biohazardous materials
- D. Infectious agents

A biohazard warning label is essential for identifying materials that may pose a risk to human health due to their infectious or hazardous nature. Blood products, such as a unit of blood released for clinical use, are handled according to specific regulations and guidelines, especially in clinical settings where they have been tested and deemed safe before release. This unit of blood is generally not labeled with a biohazard warning because it is used for therapeutic purposes and does not present a biohazard risk to patients or healthcare providers in normal circumstances. In contrast, radioactive waste containers, biohazardous materials, and infectious agents are considered hazards that require clear labeling to ensure the safety of those who might come into contact with them. Proper labeling helps maintain safety protocols, informs personnel about the risks involved, and dictates the necessary precautions for handling such materials. Therefore, while the other categories require biohazard labeling to inform of the inherent dangers, blood units released for clinical use, being regulated and screened, do not.

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://arrtnuclearmedicine.examzify.com>

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

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