

Computed Tomography Technologist Practice Exam (Sample)

Study Guide



Everything you need from our exam experts!

This is a sample study guide. To access the full version with hundreds of 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. Don't worry about getting everything right, 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, and take breaks to retain information better.

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.

7. Use Other Tools

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!

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Questions

- 1. What is the test bolus method used for in IV contrast administration?**
 - A. To calculate the radiation dose**
 - B. To determine the peak enhancement time**
 - C. To evaluate patient comfort**
 - D. To schedule follow-up scans**
- 2. In MDCT and SDCT, what common measure is referred to as 'pitch'?**
 - A. Speed of the data acquisition**
 - B. Relationship between the detector rows and the beam**
 - C. Geometric arrangement of the wires**
 - D. Size of the display field of view**
- 3. What percentage difference corresponds to 1 Hounsfield Unit (HU) compared to water?**
 - A. 0.01%**
 - B. 0.1%**
 - C. 1%**
 - D. 10%**
- 4. What happens to the viscosity of iodinated contrast as its iodine concentration varies?**
 - A. It increases with lower concentrations**
 - B. It decreases with higher concentrations**
 - C. It remains constant regardless of concentration**
 - D. It increases with higher concentrations**
- 5. What is indicated by a high modulation transfer function value?**
 - A. Poor image quality**
 - B. Enhanced spatial resolution**
 - C. Increased image noise**
 - D. Lower imaging speed**

- 6. What is a region of interest (ROI) in imaging?**
- A. An area on the image defined by the operator for analysis**
 - B. A specific imaging technique used for diagnostics**
 - C. The entire image area collected during a scan**
 - D. A section of the body scanned during the procedure**
- 7. What type of artifact is characterized by dark streaks and areas of decreased density?**
- A. Motion artifacts**
 - B. Beam-hardening artifacts**
 - C. Partial volume artifacts**
 - D. Edge enhancement artifacts**
- 8. At which point should the window level be set?**
- A. At the average attenuation number of the room**
 - B. At the same value as the average attenuation number of the tissue of interest**
 - C. At the maximum attenuation number of the body part**
 - D. At an arbitrary value for optimal viewing**
- 9. Which component of the imaging system is responsible for converting photon data to digital signals?**
- A. Reconstruction processor**
 - B. Detector array system**
 - C. Image processing software**
 - D. Data acquisition system**
- 10. If the volume of contrast increases, what happens to the desired enhancement level?**
- A. It decreases**
 - B. It remains the same**
 - C. It fluctuates**
 - D. It increases**

Answers

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

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Explanations

1. What is the test bolus method used for in IV contrast administration?

- A. To calculate the radiation dose
- B. To determine the peak enhancement time**
- C. To evaluate patient comfort
- D. To schedule follow-up scans

The test bolus method is a technique used in the context of intravenous contrast administration to determine the peak enhancement time of a particular vascular structure or the overall area of interest. By administering a small initial dose of contrast material, technologists can observe how quickly and effectively the contrast fills the target area. This helps in identifying the optimal timing for subsequent imaging after a full dose has been injected, ensuring that images are captured at the point where contrast enhancement is at its peak. This is crucial for obtaining high-quality images that can significantly improve diagnostic accuracy. The other choices focus on aspects that are not primary objectives of the test bolus method. Calculating radiation dose is related to the imaging protocol but does not pertain to the contrast timing. Evaluating patient comfort is important in all aspects of imaging but is not the purpose of the test bolus method. Scheduling follow-up scans is a procedural aspect of patient care and imaging management, rather than a direct function of determining peak contrast enhancement.

2. In MDCT and SDCT, what common measure is referred to as 'pitch'?

- A. Speed of the data acquisition
- B. Relationship between the detector rows and the beam**
- C. Geometric arrangement of the wires
- D. Size of the display field of view

In multidetector computed tomography (MDCT) and single-detector computed tomography (SDCT), the term 'pitch' specifically refers to the relationship between the movement of the table and the width of the x-ray beam. It is defined as the ratio of the distance the patient table moves during one complete rotation of the x-ray tube to the total width of the x-ray beam being emitted from the detector rows. Understanding pitch is crucial for controlling image quality and radiation dose. A higher pitch indicates that the table moves further during a rotation, which can result in lower radiation exposure but may compromise image quality due to reduced overlap of images. Conversely, a lower pitch results in more detailed imaging due to increased overlap but can lead to higher radiation doses. Options that mention speed of data acquisition, geometric arrangement of the wires, or the size of the display field of view, while relevant to CT technology and operation, do not accurately define pitch within the context of MDCT and SDCT. Therefore, recognizing pitch as a measure of the relationship between the detector rows and the beam is essential for understanding how CT imaging techniques balance speed, quality, and safety.

3. What percentage difference corresponds to 1 Hounsfield Unit (HU) compared to water?

- A. 0.01%
- B. 0.1%**
- C. 1%
- D. 10%

To understand the percentage difference corresponding to 1 Hounsfield Unit (HU) compared to water, it is essential to recognize the reference point of the Hounsfield scale. The Hounsfield Unit is a quantitative scale for measuring radiodensity in computed tomography (CT). On this scale, the radiodensity of water is defined as 0 HU, while air is -1000 HU and dense bone can measure over +1000 HU. When considering what constitutes 1 HU, this represents a variation in X-ray attenuation that is very small. Given that water is the baseline (0 HU) and anything denser than water will register as a positive number of HUs, a difference of just 1 HU signifies that the object being measured has an attenuation just slightly above that of water. To determine the percentage difference, we look at how 1 HU compares to the Hounsfield value for water. The density of water is approximately 1000 kg/m³, and since 1 HU corresponds to a change in attenuation of about 0.1% from the density of water, this makes sense in the context of how we calculate HUs based on density differences. Thus, 1 HU can be interpreted as a difference of approximately

4. What happens to the viscosity of iodinated contrast as its iodine concentration varies?

- A. It increases with lower concentrations
- B. It decreases with higher concentrations
- C. It remains constant regardless of concentration
- D. It increases with higher concentrations**

Iodinated contrast media are widely used in medical imaging, and their viscosity plays a significant role in determining how they flow and distribute within the body during imaging procedures. As the iodine concentration in iodinated contrast media increases, the viscosity also tends to increase. This phenomenon is primarily due to the molecular interactions and the overall viscosity of the liquid being affected by the higher concentration of iodine, which is a dense and viscous element. In practical terms, a higher concentration of iodine means that there are more iodine molecules in the contrast agent. As these molecules interact, they create a thicker fluid, thereby increasing viscosity. This property can impact the ease of injection and potentially influence imaging outcomes. Understanding this relationship is crucial for healthcare providers to ensure the appropriate choice of contrast medium for specific procedures while taking into account the possible effects on injection pressure and patient comfort.

5. What is indicated by a high modulation transfer function value?

- A. Poor image quality**
- B. Enhanced spatial resolution**
- C. Increased image noise**
- D. Lower imaging speed**

A high modulation transfer function (MTF) value is indicative of enhanced spatial resolution in imaging systems. MTF is a measure of the system's ability to preserve the contrast of various spatial frequency patterns in the image being acquired. When the MTF value is high, it means the system can effectively reproduce fine details, leading to sharper images with better contrast. In medical imaging, like computed tomography (CT), good spatial resolution is critical for accurately identifying small structures or lesions. A high MTF reflects the imaging system's proficiency in resolving these details, making it crucial for diagnostic purposes. The ability to distinguish between closely spaced objects translates directly to improved image quality, which is paramount in effective medical diagnoses. Other options such as poor image quality, increased image noise, and lower imaging speed do not correlate with a high MTF value, as these factors would typically result in decreased spatial resolution or poorer overall image quality.

6. What is a region of interest (ROI) in imaging?

- A. An area on the image defined by the operator for analysis**
- B. A specific imaging technique used for diagnostics**
- C. The entire image area collected during a scan**
- D. A section of the body scanned during the procedure**

A region of interest (ROI) in imaging is defined as an area on the image that the operator selects for analysis. This concept is fundamental in diagnostic imaging because it allows for focused examination of specific anatomical structures or pathological findings. By isolating the ROI, technologists can enhance their analysis of that region, facilitating accurate assessment and measurements that are essential for diagnosis and treatment planning. Selecting an ROI is particularly useful when trying to quantify densities, sizes, or other characteristics within a localized region, thereby improving the overall diagnostic quality of the imaging study. This targeted approach streamlines the analysis process, making it more efficient and relevant. In contrast, other options address concepts that are broader or unrelated to the specific function of an ROI. For instance, a specific imaging technique pertains to the modality's methodology rather than a defined area of focus, while the entire image area constitutes the complete dataset captured but lacks the specificity of an ROI. Similarly, a section of the body scanned during the procedure identifies a large region but does not imply the selective analysis that an ROI entails.

7. What type of artifact is characterized by dark streaks and areas of decreased density?

- A. Motion artifacts**
- B. Beam-hardening artifacts**
- C. Partial volume artifacts**
- D. Edge enhancement artifacts**

Beam-hardening artifacts are characterized by dark streaks and areas of decreased density within a CT image. This phenomenon occurs when x-ray beams pass through dense materials, such as bone, which causes lower energy photons to be absorbed more than higher energy photons. As a result, the effective energy of the x-ray beam increases as it penetrates these dense structures, leading to an image with darker areas and streaks where the beam has been hardened. Understanding this artifact helps technicians recognize its appearance to differentiate it from other artifacts, such as motion artifacts, which result from patient movement during the scan and typically cause blurriness rather than specific dark streaks. Partial volume artifacts arise when different tissues with varying densities are averaged together within a single voxel, and edge enhancement artifacts pertain to the artificial increase in contrast at the edges of structures, which is not characterized by the specific pattern of dark streaks and decreased density. Thus, the identification of beam-hardening artifacts is crucial for accurate interpretation of CT images.

8. At which point should the window level be set?

- A. At the average attenuation number of the room**
- B. At the same value as the average attenuation number of the tissue of interest**
- C. At the maximum attenuation number of the body part**
- D. At an arbitrary value for optimal viewing**

Setting the window level is an essential aspect of image processing in computed tomography (CT) that allows for optimal visualization of the specific tissues of interest. The window level specifically refers to the midpoint of the range of attenuation values that will be displayed in the resulting image. Choosing the average attenuation number of the tissue of interest as the window level is crucial because it helps to enhance the contrast and improve the visibility of structures within that specific tissue. Each type of tissue in the body has a characteristic attenuation value, and by setting the window level at this average value, the CT technologist ensures that the most diagnostic information is seen. This setting allows for the most significant number of gray shades to represent the variations in attenuation within that tissue, which helps in identifying pathologies or abnormalities. Other approaches, such as trying to set the window level at the maximum attenuation number of the body part or at an arbitrary value, may not provide the clarity needed for accurate interpretation, as they could obscure important details or make lesions harder to detect. Similarly, setting it at the average attenuation of the room does not relate to the anatomical structures being examined and would not optimize the display for diagnostic purposes.

9. Which component of the imaging system is responsible for converting photon data to digital signals?

- A. Reconstruction processor**
- B. Detector array system**
- C. Image processing software**
- D. Data acquisition system**

The data acquisition system is crucial in the imaging process because it directly converts the captured photon data into digital signals that can be processed further. This component serves as the intermediary that takes the analog information generated by the detector and transforms it into a digital format. This conversion is essential, as digital signals are necessary for subsequent image reconstruction and processing tasks. The other components play different roles in the overall imaging workflow. The reconstruction processor is involved in assembling the digital data into a coherent image after conversion. The detector array system is where the initial detection of photons occurs, but it does not handle the conversion to digital signals. Image processing software is utilized after the data has been digitized to enhance, analyze, or manipulate the resulting images, but it does not participate in the initial conversion from photon data to digital signals.

10. If the volume of contrast increases, what happens to the desired enhancement level?

- A. It decreases**
- B. It remains the same**
- C. It fluctuates**
- D. It increases**

When the volume of contrast material administered during a CT scan increases, it generally leads to a higher degree of vascular or organ enhancement. This is because a larger volume allows for a greater concentration of the contrast agent to be present in the bloodstream or within specific tissues, enhancing their visibility on the images produced. A higher volume of contrast enhances the attenuation difference between the tissues being evaluated and the surrounding structure, which improves the diagnostic quality of the CT images. This is particularly important in enhancing specific areas of interest, such as tumors or vascular lesions, allowing for clearer differentiation from normal tissue. With this understanding, it becomes clear that increasing the volume of contrast typically results in an increase in the desired enhancement level, thereby making the option that states the enhancement level increases the appropriate choice in this context.

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://computedtomographytechnologist.examzify.com>

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