

Radiation Therapy Board Practice Exam (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. At what level of thoracic vertebrae are the adrenal glands located?**
 - A. 12**
 - B. 10**
 - C. 8**
 - D. 6**
- 2. When treating a patient with prostate cancer, which of the following factors would not cause prostate movement?**
 - A. Respiration**
 - B. Rectal volume**
 - C. Patient position variation**
 - D. Cecum volume**
- 3. Which theory of radiation interaction is illustrated by the operating principles of an ionization chamber?**
 - A. Bragg-Gray cavity theory**
 - B. Spencer-Attix theory**
 - C. Burlin cavity theory**
 - D. Common theory**
- 4. What is the main advantage of proton therapy over conventional photon therapy?**
 - A. Higher radiation dose**
 - B. Better conformity to tumor shape**
 - C. Reduced treatment duration**
 - D. Less patient discomfort**
- 5. During photon interaction with matter, which of the following can occur?**
 - A. Protons capture electrons**
 - B. Minimum energy is always released**
 - C. Photons are converted to neutrons**
 - D. Energy can be emitted as bremsstrahlung**

6. What is a common subacute post radiation syndrome following total CNS radiation?

- A. Myelitis**
- B. Hypersomnia**
- C. Low WBC**
- D. Esophagitis**

7. The rationale for using a half-beam block in a treatment field is based on which factor?

- A. Reduce scatter dose to the central axis**
- B. Absence of beam divergence at the central axis**
- C. Increase accuracy of dose calculation**
- D. Promote depth of Dmax**

8. What is the term for nutrition that bypasses the gastrointestinal tract and introduces nutrients directly into the veins?

- A. Enteral**
- B. Parenteral**
- C. Gastrostomy**
- D. Nasogastrostomy**

9. Which of the following radiation measuring devices is appropriate for verifying dose calculations in specific areas of a treatment field?

- A. ion chamber**
- B. film badge**
- C. pocket dosimeter**
- D. thermoluminescent dosimeter**

10. What is the most important method used to confirm malignancy?

- A. Radiologic imaging**
- B. Hematologic study**
- C. Histopathological screening**
- D. Clinical staging**

Answers

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

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Explanations

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1. At what level of thoracic vertebrae are the adrenal glands located?

- A. 12**
- B. 10**
- C. 8**
- D. 6**

The adrenal glands, also known as the suprarenal glands, are anatomically situated on top of the kidneys. Specifically, they are located at the level of the 12th thoracic vertebra (T12). This placement can be attributed to their anatomical relationship to the kidneys and the diaphragm. Generally, the right adrenal gland sits slightly lower than the left due to the presence of the liver on the right side of the body. Understanding the precise location is important in both diagnostic imaging and in therapeutic procedures involving the thorax and upper abdominal regions. For medical professionals, especially those involved in radiation therapy, knowing these anatomical landmarks is crucial for targeted treatment planning and avoiding surrounding healthy tissues. The other vertebral levels mentioned are not aligned with the actual anatomical positioning of the adrenal glands. The 10th, 8th, and 6th thoracic vertebrae would place the glands at incorrect locations in relation to the kidneys. Hence, aligning with anatomical knowledge, the correct level is indeed the 12th thoracic vertebra.

2. When treating a patient with prostate cancer, which of the following factors would not cause prostate movement?

- A. Respiration**
- B. Rectal volume**
- C. Patient position variation**
- D. Cecum volume**

The movement of the prostate during treatment can be influenced by several physiological and anatomical factors. In this context, the option related to cecum volume contributes less directly to prostate movement compared to the other listed factors. Respiration can cause shifts in the entire pelvic region, leading to potential changes in the position of the prostate. As the diaphragm moves during breathing, it can create variations in intra-abdominal pressure which may influence the surrounding structures. Rectal volume is crucial as the fullness of the rectum can displace the prostate; a distended rectum exerts pressure and can shift the prostate's position. Similarly, variations in patient position, such as differences in alignment or comfort throughout treatment sessions, may lead to changes in prostate location, resulting in inconsistent treatment delivery. In contrast, while the cecum, part of the large intestine, may be located in proximity to the prostate, changes in its volume do not directly affect prostate movement during treatment. The cecum mainly interacts with the bowel and does not have the same level of influence on the pelvic organs as factors such as respiration, rectal volume, or patient positioning. Thus, understanding the dynamics of organ movement due to physiological variances is crucial for maintaining precision in radiation therapy for prostate.

3. Which theory of radiation interaction is illustrated by the operating principles of an ionization chamber?

A. Bragg-Gray cavity theory

B. Spencer-Attix theory

C. Burlin cavity theory

D. Common theory

The Bragg-Gray cavity theory is fundamental to understanding how an ionization chamber operates, as it describes the relationship between the ionization produced in a gas-filled cavity and the energy deposited by radiation in the surrounding medium. This theory posits that radiation interacts with the medium, leading to ionization, which can be measured to assess the radiation dose. Ionization chambers work on the principle that when radiation passes through a gas, it can ionize the gas molecules, creating ion pairs. The detection and measurement of these ions enable practitioners to determine the amount of radiation energy deposited in a specific volume. The Bragg-Gray theory facilitates this by providing a framework for calculating the dose in tissue based on the ionization measured in the cavity gas, taking into account the density and atomic number differences between the gas and the surrounding medium. This theory is significant as it allows for the accurate calibration and use of ionization chambers in clinical settings, as such devices are typically employed to monitor radiation dose in various applications, including therapy and radiation protection. The other theories mentioned, while they have relevance to radiation interactions, do not align as closely with the principles governing the operation of an ionization chamber. For instance, while the Spencer-Attix theory also addresses ion

4. What is the main advantage of proton therapy over conventional photon therapy?

A. Higher radiation dose

B. Better conformity to tumor shape

C. Reduced treatment duration

D. Less patient discomfort

Proton therapy offers a significant advantage over conventional photon therapy in terms of better conformity to tumor shape. This is primarily due to the unique physical properties of protons. Unlike photons, which generally deposit energy along their entire path and can continue to affect surrounding healthy tissue even after passing through the tumor, protons are charged particles that have a well-defined range. When protons enter the body, they deposit minimal energy until they reach a specific depth, known as the Bragg peak, where they release the majority of their energy. This allows clinicians to precisely tailor the radiation dose to match the three-dimensional shape of the tumor, thereby sparing more surrounding healthy tissue from unnecessary radiation exposure. This increased conformity helps to minimize side effects and complications associated with radiation therapy. In contrast, while factors such as treatment duration, patient discomfort, and radiation dose are relevant to both types of therapy, they do not capture the unique benefit of dose distribution that proton therapy provides, making better conformity to tumor shape the key advantage in this context.

5. During photon interaction with matter, which of the following can occur?

- A. Protons capture electrons**
- B. Minimum energy is always released**
- C. Photons are converted to neutrons**
- D. Energy can be emitted as bremsstrahlung**

During photon interaction with matter, energy can indeed be emitted as bremsstrahlung, which is a process that occurs when high-energy photons interact with charged particles, typically electrons. When a photon interacts with the electric field of an atomic nucleus or an electron, it may lose energy and be deflected from its original path. This energy lost can lead to the emission of new photons, termed bremsstrahlung radiation, which can occur across a spectrum of energies. This phenomenon is particularly prevalent in high-energy environments, such as in radiation therapy where photons from treatment beams interact with the patient's tissues. The resulting bremsstrahlung radiation can be significant, especially in heavier elements where the atomic number increases the likelihood of such interactions. The energy emitted can contribute to the radiation dose and is a critical aspect for clinicians to consider during treatment planning and delivery, ensuring the effectiveness and safety of radiation therapy. In contrast, the other options do not accurately reflect processes relevant to photon interactions with matter. For instance, proton capture of electrons is not relevant since protons do not capture electrons in this context, and minimum energy being always released is misleading as energy transfer can vary widely depending on the interaction specifics. Similarly, the conversion of photons to neutrons does not occur under typical

6. What is a common subacute post radiation syndrome following total CNS radiation?

- A. Myelitis**
- B. Hypersomnia**
- C. Low WBC**
- D. Esophagitis**

Myelitis is recognized as a common subacute post-radiation syndrome following total central nervous system (CNS) radiation due to the sensitivity of the spinal cord and neurological structures to radiation exposure. When radiation is applied to the CNS, it can cause inflammation of the spinal cord, leading to myelitis, which can manifest several weeks to months after treatment. This phenomenon results from the pathological effects of radiation on the delicate nerve tissues, leading to a range of neurological symptoms dependent on the area affected. Radiation-induced myelitis typically presents with signs like weakness, sensory changes, and other neurological deficits, differentiating it from acutely occurring symptoms that are more immediate in nature. While conditions such as hypersomnia, low white blood cell counts (WBC), and esophagitis may occur in varying settings of radiation treatment, they are not specifically identified as common subacute syndromes associated with total CNS radiation. For example, hypersomnia can occur due to various factors unrelated to CNS radiation specifically, low WBC could be connected to bone marrow suppression depending on the treatment site, and esophagitis is more commonly associated with radiation to the thoracic region rather than the CNS. Therefore, myelitis stands out as the principal concern in

7. The rationale for using a half-beam block in a treatment field is based on which factor?

- A. Reduce scatter dose to the central axis**
- B. Absence of beam divergence at the central axis**
- C. Increase accuracy of dose calculation**
- D. Promote depth of Dmax**

The use of a half-beam block in radiation therapy is primarily designed to enhance the precision of radiation delivery within a treatment field. When focusing on the specifics of beam behavior, it is important to understand that the half-beam block is typically placed to create a defined edge, effectively reducing exposure on one side of the treatment area while maintaining the treatment efficacy on the other side. In this context, the rationale connecting the half-beam block to the absence of beam divergence at the central axis is crucial. At the central axis of the radiation beam, the dose distribution is most consistent and uniform, which is ideal for targeted therapy. By blocking half of the beam, the clinician can manipulate the dose distribution without increasing scatter radiation significantly at the central axis, thus aiding in preserving the prescribed dose to the tumor while minimizing exposure to surrounding healthy tissues. This method is particularly beneficial in situations where the tumor's shape requires precise targeting and where adjacent organs at risk (OARs) must be safeguarded from unnecessary irradiation. The careful application of a half-beam block allows for improved dose conformity to the target volume while maintaining central axis integrity.

8. What is the term for nutrition that bypasses the gastrointestinal tract and introduces nutrients directly into the veins?

- A. Enteral**
- B. Parenteral**
- C. Gastrostomy**
- D. Nasogastrostomy**

The term for nutrition that bypasses the gastrointestinal tract and introduces nutrients directly into the veins is parenteral nutrition. This method is utilized when a patient is unable to ingest food orally or has a non-functional gastrointestinal system. By delivering nutrients directly into the bloodstream, parenteral nutrition provides essential macros and micros, ensuring that the body receives the necessary caloric intake and nutritional support required for recovery or maintenance of health. Enteral nutrition, on the other hand, involves supplying nutrients directly to the gastrointestinal tract, typically through feeding tubes that access the stomach or intestines. Gastrostomy refers to a specific surgical procedure where an opening is created in the stomach for feeding, while nasogastrostomy involves placing a tube through the nose into the stomach. Both of these techniques are forms of enteral nutrition rather than parenteral, as they utilize the digestive system rather than bypassing it entirely.

9. Which of the following radiation measuring devices is appropriate for verifying dose calculations in specific areas of a treatment field?

- A. ion chamber**
- B. film badge**
- C. pocket dosimeter**
- D. thermoluminescent dosimeter**

The correct answer is thermoluminescent dosimeter (TLD). TLDs are particularly useful in radiation therapy for verifying dose calculations in specific areas of a treatment field due to their ability to measure the absorbed dose of ionizing radiation. TLDs use materials that store energy when exposed to radiation and release it as light upon heating, which can be quantified to determine the dose received. One of the primary advantages of TLDs is their precision in measuring radiation doses in different energy ranges, which makes them suitable for personalized dose verification and area-specific assessments. In clinical settings, TLDs can be placed at specific points within the treatment field to ensure that the delivered dose matches the calculated dose, thus providing valuable data on treatment efficacy and patient safety. In contrast, devices like ion chambers are typically used for calibration purposes or for measuring radiation in air rather than verifying specific dose calculations in a treatment area. Film badges are primarily used for monitoring personnel exposure over time rather than for specific dose verification. Pocket dosimeters provide real-time readings but are less precise for accurately verifying the dose in a defined treatment field. Therefore, TLDs stand out for their unique properties that align closely with the goal of verifying treatment doses.

10. What is the most important method used to confirm malignancy?

- A. Radiologic imaging**
- B. Hematologic study**
- C. Histopathological screening**
- D. Clinical staging**

The most important method used to confirm malignancy is histopathological screening. This technique involves the microscopic examination of tissue samples obtained through biopsy. The pathologist examines the cells within the tissue to determine if any malignant characteristics are present. This direct analysis of cellular structure and morphology provides definitive information about the presence of cancer, which is critical for diagnosis and subsequent treatment planning. Histopathological screening not only confirms malignancy, but it also provides information regarding the type of cancer, its grade, and other characteristics that can influence treatment options and prognosis. While radiologic imaging can suggest the presence of a tumor and aid in staging cancer, it cannot provide the cellular and structural details needed to definitively confirm malignancy. Hematologic studies primarily assess blood components and can indicate some conditions but do not directly confirm solid tumors. Clinical staging is essential for determining the extent of disease and planning treatment, yet it is the histopathological assessment that provides the pivotal confirmation needed for a cancer diagnosis.

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://radiationtherapyboard.examzify.com>

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

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