# DIAGNOSTIC AND THERAPEUTIC MODALITIES PRACTICE TEST (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 are the primary aims of radiation oncology?**

A. diagnosis only

B. therapy only

C. research only

D. cure or palliative care

**2. Which statement is most accurate about screen-film mammography resolution?**

A. It is measured in lp/mm and has a practical limit near 15 lp/mm

B. It is unrelated to image sharpness

C. It can exceed 50 lp/mm with standard equipment

D. It is determined solely by exposure time

**3. Which PET finding would indicate an active seizure?**

A. Seizure free

B. Active seizure

C. Normal metabolism

D. Decreased glucose uptake

**4. Which modality uses sealed radioactive isotopes placed in tissues, body cavities, or on body surfaces?**

A. Linear Accelerators

B. External Beam

C. Brachytherapy

D. Cobalt-60 Unit (Gamma Knife)

**5. RF pulses deposit energy into the patient to excite hydrogen nuclei. Which modality uses this principle?**

A. Ultrasound

B. CT

C. MRI

D. PET

**6. Which relaxation process is associated with loss of phase coherence among spins?**

A. T1-relaxation

B. Spin diffusion

C. Proton exchange

D. T2-relaxation

**7. The ability to render small objects on the image describes which term?**

A. spatial resolution

B. contrast resolution

C. dynamic range

D. signal

**8. Which factor most directly contributes to the strength of the MR signal among the following?**

A. phase coherence

B. signal strength

C. spin density

D. mass attenuation

**9. Who provides patient education and monitors care?**

A. Radiation Oncologist

B. Radiation Therapist

C. Radiation Oncology Nurse

D. Medical Physicist

**10. Which lumbar vertebrae are typically included in a standard DXA lumbar spine assessment?**

A. L2-L5

B. L1-L3

C. L3-L5

D. L1-L4

# Answers

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

# Explanations

## 1. What are the primary aims of radiation oncology?

A. diagnosis only

B. therapy only

C. research only

D. cure or palliative care

*The main idea here is that radiation oncology aims to treat cancer with the goal of either eradicating it or relieving symptoms. Radiation therapy is used to destroy cancer cells, but the intent can be curative when the disease is localized or manageable, or palliative when cure isn't possible, to relieve pain, bleeding, obstruction, or other symptoms and improve quality of life. Diagnosis is handled by imaging and pathology, not the primary aim of this field, and while research advances how we use radiation, the practical focus is on curing or palliation—not just therapy alone or research alone.*

## 2. Which statement is most accurate about screen-film mammography resolution?

A. It is measured in lp/mm and has a practical limit near 15 lp/mm

B. It is unrelated to image sharpness

C. It can exceed 50 lp/mm with standard equipment

D. It is determined solely by exposure time

*Spatial resolution in screen-film mammography is about how finely details can be distinguished, and it is expressed in line pairs per millimeter (lp/mm). In conventional screen-film systems, the practical limit is around 15 lp/mm because the image blur comes from several unavoidable sources: the finite size of the x-ray focal spot creates geometric blur, the screen-film interface adds detail loss, and imperfect contact between screen and film plus processing steps further degrade sharpness. Motion during exposure can worsen this, but the most influential factor is the overall blur built into the system, which caps how much detail can be resolved. So describing resolution with lp/mm and a practical ceiling near 15 lp/mm aligns with how these systems perform in typical practice. Other statements aren't accurate because resolution is indeed tied to image sharpness, it isn't realistic for standard equipment to reach 50 lp/mm, and resolution isn't determined solely by exposure time—many geometric and processing factors set the limit.*

## 3. Which PET finding would indicate an active seizure?

A. Seizure free

B. Active seizure

C. Normal metabolism

D. Decreased glucose uptake

*In PET imaging with FDG, the amount of glucose the brain uses reflects neuronal activity. During an active seizure, the affected brain region has markedly increased neuronal firing and energy demand, so it shows focal hypermetabolism (increased glucose uptake) on the scan. This is why the sign of an active seizure is increased glucose uptake in the seizured area. Seizure-free or baseline function would not show this ictal hypermetabolism, and decreased uptake would indicate reduced metabolic activity (often seen interictally or after a seizure), not an ongoing ictal event.*

**4. Which modality uses sealed radioactive isotopes placed in tissues, body cavities, or on body surfaces?**

A. Linear Accelerators

B. External Beam

C. Brachytherapy

D. Cobalt-60 Unit (Gamma Knife)

*Brachytherapy. It uses sealed radioactive sources placed directly into tissues, body cavities, or on the surface of the body. Placing the sources close to the tumor delivers a high radiation dose to the target while the dose falls off quickly with distance, helping spare surrounding healthy tissue. The sources are sealed to prevent leakage, and placement can be interstitial (into tissue), intracavitary (within a body cavity), or surface-based (as molds or applicators). In contrast, external beam approaches deliver radiation from outside the body with machines like linear accelerators, and the Gamma Knife cobalt-60 setup, though using sealed sources, delivers beams from outside rather than implanting sources inside the patient.*

**5. RF pulses deposit energy into the patient to excite hydrogen nuclei. Which modality uses this principle?**

A. Ultrasound

B. CT

C. MRI

D. PET

*RF pulses excite hydrogen nuclei in a strong magnetic field, which is the hallmark of MRI. The pulse tips the net magnetization away from alignment with the main field, depositing energy into the tissue. After the pulse, the protons relax back to their resting state and emit signals that are captured by coils. The rate at which they relax (T1 and T2) varies among tissues, and MRI uses different sequences and gradient fields to convert these relaxation properties into images with contrast. This mechanism—using radiofrequency energy to manipulate and detect hydrogen nuclei—sets MRI apart from other imaging modalities: ultrasound relies on sound waves, CT on X-ray attenuation, and PET on radioactive tracer decay. So the principle described is used by MRI.*

**6. Which relaxation process is associated with loss of phase coherence among spins?**

A. T1-relaxation

B. Spin diffusion

C. Proton exchange

D. T2-relaxation

*The key idea is transverse dephasing. After you tip the spins into the transverse plane, they no longer precess in perfect unison because local magnetic field variations and spin-spin interactions make their precession rates differ. Those tiny differences cause the spins to drift out of phase with each other, so the net transverse magnetization decays over time. That loss of phase coherence is what T2-relaxation describes. In contrast, T1-relaxation is about longitudinal magnetization recovering through energy exchange with the lattice, not about coherence in the transverse plane. Proton exchange relates to chemical exchange processes that can affect relaxation behavior, and spin diffusion is a related phenomenon that can influence dephasing in some contexts, but the direct process responsible for losing phase coherence among spins is T2-relaxation.*

## 7. The ability to render small objects on the image describes which term?

A. spatial resolution

B. contrast resolution

C. dynamic range

D. signal

*Rendering tiny details on an image is all about spatial resolution. This term describes how finely an imaging system can distinguish small structures or closely spaced objects; the smaller the objects you can visualize, the higher the spatial resolution. In practice, improving spatial resolution means using smaller pixels or voxels, better detector geometry, and sharper imaging optics so that fine details aren't blurred. By contrast, contrast resolution is about telling apart different gray levels, dynamic range is the overall brightness span the system can show, and signal refers to the raw measured intensity—none of these describe the ability to resolve small objects as directly as spatial resolution does.*

## 8. Which factor most directly contributes to the strength of the MR signal among the following?

A. phase coherence

B. signal strength

C. spin density

D. mass attenuation

*The strength of the MR signal is determined by the net transverse magnetization that results after the radiofrequency pulse. This net transverse magnetization is proportional to how many hydrogen protons are present in the voxel—spin density. Each proton contributes a tiny magnetic moment, and in a region with more protons, these moments add up to a larger transverse component. That larger transverse magnetization induces a stronger signal in the receive coil, so tissues with higher spin density produce a stronger MR signal. Phase coherence affects how the spins add up over time, but the initial signal magnitude is set by how many spins there are to begin with. Even with perfect coherence, fewer spins yield a weaker signal. Mass attenuation is a concept from X-ray imaging and doesn't influence MR signal generation.*

## 9. Who provides patient education and monitors care?

A. Radiation Oncologist

B. Radiation Therapist

C. Radiation Oncology Nurse

D. Medical Physicist

*During radiation therapy, patient education and ongoing monitoring are best handled by the Radiation Oncology Nurse. They explain treatment steps, what to expect, and how to care for oneself during therapy, while also continually assessing symptoms, hydration, nutrition, skin changes, and emotional well-being. The nurse serves as the primary communicator and care coordinator, addressing questions, reinforcing safety measures, and coordinating with the rest of the team to adjust care as needed and keep the treatment on track. The Radiation Oncologist guides medical decision-making and the overall plan, the Radiation Therapist handles day-to-day treatment delivery and patient positioning, and the Medical Physicist ensures equipment accuracy and safety; none of these roles centers on patient education and ongoing monitoring to the same extent as the nurse.*

**10. Which lumbar vertebrae are typically included in a standard DXA lumbar spine assessment?**

A. L2-L5

B. L1-L3

C. L3-L5

D. L1-L4

*The measurement for lumbar spine DXA is designed to give a reliable bone density reading by averaging over multiple vertebrae that are representative and relatively free of artifacts. The standard approach uses the first through the fourth lumbar vertebra because this four-vertebra region provides enough data points to stabilize the result while staying clear of the lower levels where degenerative changes or pelvic structures can introduce inaccuracies. Including L5 would increase the chance of artifact from the pelvis or sacrum, and using fewer vertebrae (like L1-L3) reduces precision. So, L1 through L4 is the typical, best-balanced selection for a standard lumbar spine DXA assessment.*

# 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://diagnostictherapeuticmodalities.examzify.com

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