ABR Diagnostic Physics Exam:
How to prepare for Part 1 in One week

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Outline

• Exam Overview
  • ABR website
  • Important dates
  • Results

• Hints & Strategies
  • Exam format
  • Exam resources
  • Exam content

• Resources

Slides available here:
Outline

- Exam Overview
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- Resources

Slides available here:

... and here

Online: goo.gl/bGkJ86
ABR Website

Website: theabr.org/ic-rp-landing

Email: ic@theabr.org
ABR Eligibility Requirements

Eligibility requirements here

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Part 1 Eligibility

4. When am I eligible to apply for certification?

You can apply to take Part 1 of the computer-based examination anytime after you are officially enrolled in a CAMPEP-accredited medical physics graduate program, DMP program, certificate program, or residency. Enrolled means that you have been accepted into the program and have begun coursework or residency duties. Please see the website: http://www.theabr.org/ic-rp-process#part1, for application process and dates.

http://www.theabr.org/ic-mp-faq
CAMPEP Eligibility

More eligibility requirements here!

Graduate Education Programs
Residency Education Programs
Professional Doctorate in Medical Physics (DMP) Degree Programs
Certificate Programs
Continuing Education

The Mission of the Commission on Accreditation of Medical Physics Education Programs (CAMPEP) is to establish and maintain voluntary accreditation of educational programs in medical physics.

CAMPEP is a nonprofit organization, independent of any professional societies, educational institutions, or governmental agencies.

Accreditation is a voluntary, non-governmental process that ensures the quality of educational programs in medical physics.

http://www.campep.org/

Online: goo.gl/bGjS86
Exam Registration & Content Information

Time Limitation for Attaining Initial Certification ("Board Eligibility")

Candidates have specific time limits for remaining eligible to be initially certified by the ABR and to maintain their status as board eligible. For medical physics, "complete training" is defined as completion of a residency program or equivalent experience. Candidates are not eligible to be certified if they fail to complete training within the time limit required for initial certification, as follows:

Before January 1, 2011: December 31, 2006

January 1, 2011 or later: six full calendar years from the end of residency training or Part 2 approval, whichever comes first.

After the period of eligibility ends, candidates failing to successfully complete the initial certification process will no longer be eligible for recertification.

Calculators and Constants List

Conditions and Reregistration

Exam Registration Process

Fees, Dates, Locations

Sample Questions

Scoring and Results

Study Guide
Important Dates & Fees

- Exam Registration window: 9/1-10/31
- Notification of eligibility: 11/30
- Location Registration: Months leading up to exam
- Exam: Early August

Fees
- Registration: $505
- Cancellation: $300

Tips
- Your application may be audited
- Schedule location at the earliest possible time
- It is possible to change exam location

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Content

PART 1: General
The nature and sources of radiation
Radioactivity
Ultrasound
Nuclear magnetic resonance
Interactions of radiation with matter
Spatial distribution and transmission of radiation
Concepts of dosimetry
Instrumentation and measurement techniques
Principles of safety
Methods of quality control and quality assurance
Radiobiology
Radiation protection
Basic atomic and nuclear physics
Mathematics relevant to medical physics
Statistics

PART 1: Clinical
Physiology
Anatomy
Biochemistry
Radiation effects
Medical uses of radiation sources
Radiochemistry
Medical terminology
Ethical principles
Format

General Questions
- 237 minutes for 80 questions
  - 27 Complex [3 pts ea]
  - 53 Simple [1 pt ea]

* 30 min Break (optional)*

Clinical Questions
- 90 minutes for 75 questions
Pearson VUE

- Computer-based exam
- Cubicles
- Headphones
- Wet-erase laminated sheets
  - no erase option
  - need to request more

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http://www.pearsonvue.com/pvuelimages/clients/rba/erasable_booklet.jpg
First Time Takers Enrolled in a CAMPEP Program

Pass Rate (%)

Exam Year

Clinical

General

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Outcomes

• Pass both parts – Eligible for Part 2 upon completion of residency

• Pass general – Repeat clinical
• Pass clinical – Retake the exam
• Fail both parts – Retake the exam
Complex vs. Simple Questions

- **Simple**: (1) Zero calculational steps or (2) relatively minor arithmetic

- **Complex**: Requires some advanced reasoning and 2+ calculational steps.

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From the ABR:
Beyond the depth of maximum dose, what is the relative behavior of dose and kerma?

A. Dose and kerma fall off equally.
B. Kerma falls off faster than dose.
C. Dose falls off faster than kerma.
D. Dose falls while kerma rises.
E. Dose rises while kerma falls.
Another example:
The HVL of shielding material is 1 mm. What thickness will attenuate the beam by 90%?

A. 1.1 mm
B. 2.2 mm
C. 3.3 mm
D. 4.4 mm
E. 5.5 mm
Example: Complex Question

From the ABR:
The mass attenuation coefficient of bone (density of 1.8 g/cm³) is 0.2 cm²/g for an 80-keV gamma ray. What percentage of 80-keV photons is attenuated by a slab of bone 4 cm thick under conditions of narrow beam geometry?

A. 36%
B. 45%
C. 55%
D. 64%
E. 76%

\[
I = I_0 e^{-\left[\frac{\mu}{\rho}\right] \rho x}
\]
Example: Complex Question

Another Example:
We collected some data, what is the standard error?

A. 18.3
B. 34
C. 5.9
D. 1.5
E. 4.8

SEM = \sqrt{\frac{1}{N} \sum_{i=1}^{N} (x_i - \mu)^2} / \sqrt{N}

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Example: Clinical Question

From the ABR:
A fetus receives a dose of 2 Gy during weeks 20 to 39 of pregnancy. After birth, the child has an increased risk for what condition?
A. Trisomy 21
B. Leukemia
C. Microcephaly
D. Neonatal death

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Another Example:
What is a physiological element is contained within organ #17?

A. Bowman’s Capsule
B. Hepatocytes
C. Red pulp
D. Ampulla of Vater
The TI-30XS Calculator

- Practice before exam
- Stop using excel or any other calculator TODAY
- Use unit analysis
- Ball-park solutions

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Exponential Decay

Accounts for ~ 30% of the math

- Other options
  - Base 2
    \[ A = A_0 2^{-\frac{t}{T_{1/2}}} \]
  - Taylor series
    \[ e^{-ax} = 1 - ax + \frac{(ax)^2}{2} - \frac{(ax)^3}{3!} \]

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Study Material: General

- General
  - Essential Physics of Medical Imaging
  - The Physics of Radiation Therapy
  - Physics in Nuclear Medicine
  - Review of Radiologic Physics

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- **General**
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Tips
1. Do all example problems
2. Review all figures
3. Read cover-to-cover

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Study Material: Clinical

Clinical

- Radiobiology for the Radiologist
- Anatomy for Dummies
- Imaging Atlas of Anatomy
- Online anatomy quizzes
  - http://www.free-anatomy-quiz.com

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Additional Resources

**ABR Medical Physics:** [http://www.theabr.org/ic-rp-landing](http://www.theabr.org/ic-rp-landing)
- Registration timeline: [http://www.theabr.org/ic-rp-process](http://www.theabr.org/ic-rp-process)
- Exam length and question types: [http://www.theabr.org/ic-rp-req](http://www.theabr.org/ic-rp-req)
- Test categories: [http://www.theabr.org/ic-mp-study-guide](http://www.theabr.org/ic-mp-study-guide)
- Sample questions: [http://www.theabr.org/ic-rp-sample](http://www.theabr.org/ic-rp-sample)

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“Well, tests ain't fair. Those that study have an unfair advantage.”
— Allan Dare Pearce, Paris in April
More Resources


Online: goo.gl/bGjS86
Part 1 General Enrollment

Medical Physics: An Update of the ABR Requirements and Processes
Online: goo.gl/bGjS86
Where is the bottle neck?

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