

1. Record Nr.	UNINA9910813925103321
Autore	Powsner Rachel A
Titolo	Essentials of nuclear medicine physics and instrumentation // Rachel A. Powsner, Matthew R. Palmer, Edward R. Powsner
Pubbl/distr/stampa	Chichester ; ; Oxford ; ; Hoboken, N.J., : Wiley-Blackwell, 2013
ISBN	1-118-47348-5 1-118-47355-8
Edizione	[3rd ed.]
Descrizione fisica	1 online resource (246 p.)
Altri autori (Persone)	PalmerMatthew R. <1958-> PowsnerEdward R. <1926->
Disciplina	616.07/575
Soggetti	Nuclear medicine Medical physics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Cover; Title page; Copyright page; Contents; Preface; Acknowledgments; CHAPTER 1: Basic Nuclear Medicine Physics; Properties and structure of matter; Elements; Atomic structure; Radioactivity; The unstable nucleus and radioactive decay; Decay notation; Half-life; Questions; Answers; CHAPTER 2: Interaction of Radiation with Matter; Interaction of photons with matter; Types of photon interactions in matter; Attenuation of photons in matter; Interaction of charged particles with matter; Excitation; Ionization; Annihilation; Bremsstrahlung; Reference; Questions; Answers CHAPTER 3: Formation of RadionuclidesGenerators; Activity curves for generators; Cyclotrons; Reactors; Reactor basics; Fission; Neutron capture; Questions; Answers; CHAPTER 4: Nonscintillation Detectors; Gas-filled detectors; Theory of operation; Principles of measurement; Characteristics of the major regions of applied voltage across a gas-filled detector; Sensitivity; Types of gas-filled detectors; Semiconductor detectors; Photographic and luminescent detectors; Photographic detectors; Thermoluminescent and optically luminescent detectors; Questions; Answers CHAPTER 5: Scintillation DetectorsStructure; Scintillation crystals; Photomultiplier tubes; Preamplifiers and amplifiers; Pulse-height analyzer; The energy spectrum from a sodium iodide detector;

Photopeak; Other peaks in the energy spectrum of the source; Effect of surrounding matter on the energy spectrum; Characteristics of scintillation detectors; Energy resolution; Decay time; Efficiency; Types of scintillation-based detectors; Thyroid probe; Well counter; Dosimeters and area monitors; Questions; Answers; CHAPTER 6: Imaging Instrumentation; Theory and structure Components of the imaging system Planar imaging; Image acquisition; Questions; Answers; CHAPTER 7: Single-photon Emission Computed Tomography; Equipment; Types of cameras; Angle of rotation of heads; Two-headed cameras: fixed and adjustable; Acquisition; Arc of acquisition; Number of projection tomographic views; Collection times; Step-and-Shoot vs. Continuous Acquisition; Circular, elliptical, and body-contouring orbits; Patient motion and sinograms; Dedicated cardiac SPECT cameras; Questions; Answers; CHAPTER 8: Positron Emission Tomography; Advantages of PET imaging; Sensitivity; Resolution Radiopharmaceuticals PET camera components; Crystals; Photomultiplier tubes; Pulse-height analyzers, timing discriminators, and coincidence circuits; Septa; Factors affecting resolution in PET imaging; Positron range in tissue; Photon emissions occurring at other Than 180°; Parallax error; Attenuation in PET imaging; Attenuation correction; Standard uptake values; References; Questions; Answers; CHAPTER 9: X-ray Computed Tomography; X-ray production; X-ray imaging; Computed tomography; Overview; Multislice detector configurations; Axial and helical scanning; Hounsfield units; Questions Answers

Sommario/riassunto

An excellent introduction to the basic concepts of nuclear medicine physics This Third Edition of Essentials of Nuclear Medicine Physics and Instrumentation expands the finely developed illustrated review and introductory guide to nuclear medicine physics and instrumentation. Along with simple, progressive, highly illustrated topics, the authors present nuclear medicine-related physics and engineering concepts clearly and concisely. Included in the text are introductory chapters on relevant atomic structure, methods of radionuclide production, and the interaction
