

NUCLEAR MEDICAL PHYSICS CONTINUING CERTIFICATION EXAM CONTENT GUIDE

- 1 Radiation Protection & Professional Ethics
 - Radiation Risks
 - Protection Agencies & Groups
 - Radiation Protection Standards (10 CFR 20)
 - Medical Use Regs (10 CFR 35)
 - Shielding
 - Professionalism and Ethics
- 2 Radiation Dosimetry
 - Dose Terminology
 - External Dosimetry
 - Internal Dosimetry (MIRD)
 - Expected Doses from Clinical Studies
 - CT Dosimetry
- 3 Radioactive Decay & Radionuclide Production
 - Radioactive Decay Modes
 - Radioactive Decay Equations
 - Radionuclide Production
 - Radiopharmaceuticals
- 4 Non-imaging Detectors
 - Detector Properties
 - Ionization Detectors
 - Scintillation & Semi-conductor Detectors
 - Counting Systems
 - Counting Statistics
- 5 Imaging Systems
 - Planar Imaging Systems
 - SPECT Imaging Systems (Including hybrids)
 - PET Imaging Systems
 - CT Imaging Systems

- Image Science
- 6 Clinical Studies
- Diagnostic Studies
 - Radioembolic Therapy
 - Radionuclide Therapy

Sample Questions

Multiple Choice

1. How are ^{201}Tl and ^{123}I produced?
 - A. In fission by-products
 - B. In particle accelerators
 - C. In radionuclide generators
 - D. In neutron activation
2. A spatial resolution measurement of a SPECT system is performed using line sources of $^{99\text{m}}\text{Tc}$ according to the NEMA protocol. If the spatial resolution (FWHM) is 10.5 mm in the center of the phantom, what is the peripheral tangential spatial resolution (FWHM) at 7.5 cm from the center of the phantom?
 - A. 8 mm
 - B. 12 mm
 - C. 14 mm
 - D. 16 mm
3. What is the effect of increasing an image matrix from 128 x 128 to 256 x 256?
 - A. Improved contrast
 - B. Improved resolution
 - C. Improved signal-to-noise ratio
 - D. Decreased noise
4. If the minimum, mean, and maximum pixel counts in the central field of view of a smoothed intrinsic flood image are 4500, 5200, and 5500, respectively, what is the integral uniformity?
 - A. 5%
 - B. 6%
 - C. 10%
 - D. 14%
 - E. 15%
5. In a gate-synchronized ventricular function study, the color-coded phase image shows a group of pixels in the apex of the left ventricle displayed in the hue assigned to the atria. What is the most likely explanation for this observation?
 - A. Global left ventricular hypokinesis

- B. Valvular insufficiency
- C. Malfunctioning software
- D. Cardiac arrhythmia
- E. Apical dyskinesia

Answers for this section:

- 1. B
- 2. A
- 3. B
- 4. C
- 5. E

Fill in the Blank

The candidate must type in the correct response:

1. If the field of view of a scintillation camera is 20 cm and the matrix is 128×128 , what is the pixel size of the image? _____ mm (Round to two decimal places.)

Answer: 1.56 (1.54, 1.55, 1.56, 1.57, and 1.58 will also be accepted.)