CONTINUING EDUCATION TEST: Principles of CT and CT Technology

1. What does “beam hardening” refer to?
   A. Preferential removal of the low-energy x-rays from the x-ray beam.
   B. Preferential removal of the high-energy x-rays from the x-ray beam.
   C. Preferential removal of the low- and high-energy x-rays from a beam.
   D. Production of a wide-energy-spectrum x-ray beam.

2. What is the basic underlying goal of CT image reconstruction?
   A. Determination of how much attenuation of the x-ray beam occurred in each voxel of the reconstruction matrix.
   B. Use of 75% or more of the x-ray beam to improve data collection and resolution.
   C. Iterative reconstruction.
   D. Emphasis of quantum mottle in sectional images.

3. What causes CT image noise and results in poor-quality images?
   A. Movement of the x-ray source.
   B. A limited number of x-ray photons.
   C. Backprojection.
   D. Iterative reconstruction.

4. What limits the ability of film/screen radiography to visualize low-contrast tissues and structures without overexposing the patient?
   A. High scatter–to–primary x-ray ratios.
   B. Receptor contrast–latitude trade-off.
   C. Superimposition and conspicuity.
   D. Inefficient x-ray absorption.
   E. All of the above.
5. Which of the following statements about backprojection is correct?
A. Backprojection is a flawless technique for producing high-quality (high-resolution) images.
B. Backprojection only works well when very simple objects are scanned by CT.
C. Backprojection involves relatively simple calculations but results in blurred images.
D. None of the above.

6. Which of the following statements about a filter function is correct?
A. Filter functions are chosen for the type of tissue imaged.
B. Filter functions enhance either resolution or image noise at the expense of the other.
C. The mathematic operation of a filter function is called convolution.
D. All of the above.

7. As the CT scanner evolved, one way in which scan time was reduced was by:
A. Narrowing the beam.
B. Using multiple narrow beams or, later on, fanbeams.
C. Beam hardening.
D. All of the above.

8. To scan faster than earlier generations, fourth-generation CT:
A. Used a larger number of narrow beams.
B. Used a stationary ring of detectors.
C. Used multiple x-ray tubes.
D. All of the above.

9. Which of the following statements about sampling and spatial resolution is correct?
A. Spacing of measurements affects overall image resolution.
B. The smaller the aperture, the lower the image resolution.
C. A and B.

10. When and how does a CT scanner have high dose efficiency?
A. When geometric efficiency is high and absorption efficiency is low.
B. When geometric efficiency is low and absorption efficiency is high.
C. When a high fraction of the x-rays exiting the patient is captured.
D. None of the above.

11. What is the major drawback of CT fluoroscopy?
A. Its resolution is poorer than that of conventional CT.
B. Its sensitivity is limited.
C. It has the potential to expose a selected tissue or organ to a high radiation dose.
D. It has a real-time display lag.
E. All of the above.

12. Which technique or property allows or enables continuous nonstop rotation of detector components?
A. Helical CT.
B. EBCT.
C. Pitch.
D. Slip ring.
E. None of the above.

13. Which of the following statements is correct?
A. Pitch refers to how fast the table slides through the gantry per rotation relative to the slice thickness being acquired.
B. Pitch is a parameter associated with axial step-and-shoot scanning.
C. The most commonly used pitch is between 1.5 and 2.0.
D. For the same technique factors, pitches between 0.5 and 1.0 are generally associated with exposure of the patient to a lower radiation dose.

E. All of the above.