

Computed Tomography Imaging

1. What year was the first CT scanner built?
 - a. 1961
 - b. 1966
 - c. 1971
 - d. 1975
2. Who introduced the spiral CT in 1990?
 - a. Sir Godfrey Hounsfield
 - b. Willi Kalender
 - c. Allan Cormack
 - d. Johann Radon
3. In the early days, CT data acquisition took approximately _____ minutes per rotation.
 - a. 2
 - b. 3
 - c. 4
 - d. 5
4. What year was a modern CT system able to acquire up to 128 slices in parallel at a temporal resolution as low as 195 ms with a single x-ray source?
 - a. 2014
 - b. 2015
 - c. 2016
 - d. 2017
5. What is the underlying mathematical principle of the image formation process in CT imaging called?
 - a. Radon transform
 - b. Fourier theory
 - c. Helix theory
 - d. Kalender theory
6. X-ray projections can be converted to line integrals using _____ law enabling the application of Radon's idea to CT reconstruction.
 - a. Beer's
 - b. Stingle's
 - c. Bahner's
 - d. Puckett's
7. Using the Fourier slice theorem, we can derive an analytic reconstruction method known as _____.
 - a. Filtered front-projection
 - b. Filtered back-projection
 - c. Filtered side-projection
 - d. Filtered down-projection
8. True or false. Various ramp-like filters are used depending on the desired image characteristics, typically involving a trade-off between a smooth image appearance and a higher spatial resolution.
 - a. True
 - b. False

9. A second approach to CT reconstruction defines the problem as a system of _____ equations.
 - a. Nonlinear
 - b. Linear
 - c. Equal
 - d. Standard
10. In CT acquisition geometrics, the second-generation scanner could measure _____ from several directions simultaneously.
 - a. Beams
 - b. Radiation
 - c. Controls
 - d. Images
11. With the invention of the _____, a continuous motion of both the rotating gantry and the table became possible.
 - a. Second-generation scanner
 - b. Third-generation scanner
 - c. Fan beam
 - d. Helical CT
12. Visualization of small structures requires a _____.
 - a. High spatial resolution
 - b. Low spatial resolution
 - c. Detector aperture
 - d. Detector element spacing
13. For direct measurement of spatial resolution, a _____ phantom can be used.
 - a. Bar
 - b. Linear
 - c. Cube
 - d. Smooth
14. When an x-ray passes through an object, lower energy photons are more easily absorbed than higher energy photons, the effect is called _____.
 - a. Streaking
 - b. Image hardening
 - c. Beam hardening
 - d. Cupping
15. Beam hardening results in streak and _____ artifacts.
 - a. Noise
 - b. Cupping
 - c. Wavy
 - d. Bricking
16. What type of artifact appears mostly in low-resolution images, especially in thick slice images?
 - a. Partial volume artifacts
 - b. Scatter artifacts
 - c. Compton artifacts
 - d. Metal artifacts