

Generating Image in CT

- ___ 1. The transmission value for a single detector is a
- view
 - ray
 - profile
 - all of the above
- ___ 2. The composite electrical signal based on transmission values is the
- view
 - ray
 - profile
 - all of the above
- ___ 3. The number of rows and columns that make up the digital image is the
- matrix
 - pixel
 - voxel
 - voxel volume
- ___ 4. The smallest component of the matrix is the
- matrix
 - pixel
 - voxel
 - voxel volume
- ___ 5. The small amount of tissue represented by a pixel is the
- matrix
 - pixel
 - voxel
 - voxel volume
- ___ 6. This is calculated by knowing the dimensions of the pixel and the slice thickness
- Matrix
 - Pixel
 - Voxel
 - Voxel volume
- ___ 7. A CT image typically has a _____ matrix
- 64×64
 - 128×128
 - 256×256
 - 512×512
- ___ 8. The image matrix for CT is _____ than the image matrix for digital radiography
- smaller
 - larger
 - the same as

- ___ 9. The pixel size is reduced when the ___ size is increased and the ___ size is fixed.
- field of view, matrix
 - matrix, field of view
 - Hounsfield unit, field of view
 - field of view, Hounsfield unit
- ___ 10. CT imaging has excellent ___ because of the narrow beam collimation.
- spatial frequency
 - noise reduction
 - contrast resolution
 - spatial resolution
- ___ 11. The degree of spatial resolution in any CT imaging system is limited to the size of the ___.
- voxel
 - FOV
 - matrix
 - pixel
- ___ 12. Prior to spiral CT, the patient moved through the gantry one small increment or step at a time.
- ___ 13. Scan time remains constant for all CT studies.
- ___ 14. Pediatric protocols are unnecessary because the equipment will always adjust for the smaller patient size.
- ___ 15. The patient must be centered in the CT gantry isocenter for accurate imaging of the anatomy.

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Answer Section

1. ANS: B

The ray is the transmission value for one detector.

PTS: 1 REF: 233 OBJ: 2

2. ANS: C

The profile is the composite electrical signal based on transmission values.

PTS: 1 REF: 233 OBJ: 2

3. ANS: A

The matrix is the number of rows and columns that make up the digital image.

PTS: 1 REF: 234 OBJ: 4

4. ANS: B

The pixel (or picture element) is the smallest piece of the matrix.

PTS: 1 REF: 234 OBJ: 4

5. ANS: C

The voxel (or volume element) is the bit of tissue with attenuation characteristics represented in one pixel.

PTS: 1 REF: 234 OBJ: 4

6. ANS: D

The actual volume of the voxel, the voxel volume, has a significant effect on CT image quality.

PTS: 1 REF: 234 OBJ: 4

7. ANS: D

A CT image typically has a 512×512 matrix.

PTS: 1 REF: 234 OBJ: 4

8. ANS: A

The image matrix for CT is smaller than the image matrix for digital radiography.

PTS: 1 REF: 234 OBJ: 4

9. ANS: B

The pixel size is reduced when the matrix size is increased and the field of view size is fixed.

PTS: 1 DIF: Difficult REF: page 449

OBJ: Describe CT image characteristics of image matrix and Hounsfield unit.

10. ANS: C

CT imaging has excellent contrast resolution because of the narrow beam collimation.

PTS: 1 DIF: Moderate REF: page 455

OBJ: Discuss image quality as it relates to spatial resolution, contrast resolution, noise, linearity, and uniformity.

11. ANS: D
The degree of spatial resolution in any CT imaging system is limited to the size of the pixel.
- PTS: 1 DIF: Moderate REF: page 455
OBJ: Discuss the concepts of transverse tomography, translation, and reconstruction of images.
12. ANS: T
Prior to the introduction of slip-ring technology, the scanner could complete only one image at a time and then the patient and table would move slightly into the gantry to obtain the next. This “slice-by-slice” process was very time-consuming.
- PTS: 1 REF: 230 OBJ: 1
13. ANS: F
Scan time can vary widely and multiple factors affect the time.
- PTS: 1 REF: 236 OBJ: 9
14. ANS: F
Pediatric protocols should be a part of every CT department. This very sensitive population needs to have extra precautions taken to reduce dose.
- PTS: 1 REF: 244 OBJ: 16
15. ANS: T
Proper centering assures proper dose distribution, while inaccurate patient centering will degrade the image quality and increase the dose to the patient (especially with ATCM).
- PTS: 1 REF: 243 OBJ: 16