

SECTION 1 CE QUESTIONS
EPISODES 1 - 10

1. Which of the following components is primarily responsible for the conversion of electrical impulses to binary data?
- The ADC
 - The DAC
 - The CT Computer
 - The Detector System

Ans. A

Ref. Episode 1, Slide 5

2. Which of the following components is primarily responsible for the conversion of raw data to image data?
- The ADC
 - The DAC
 - The CT Computer
 - The Detector System

Ans. C

Ref. Episode 1, Slide 5

3. Which of the following is received by the CT Detector System?
- Convolved data
 - Raw data
 - Measurement data
 - Image data

Ans. C

Ref. Episode 1, Slide 5

4. *Which of the following components is most responsible for determining slice thickness in SDCT systems?
- The Detector System
 - The Pre-patient collimator
 - The ADC
 - The Pre-detector collimator

- 1
- 2
- 3
- 4

Ans. B

Ref. Episode 1, Slide 4

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5. Which of the following components is primarily responsible for hardening the beam?
- a. The DAC
 - b. The ADC
 - c. The Beam Shaping Filter
 - d. The Detector System

Ans. C

Ref. Episode 1, Slide 3

6. The conversion of electrical energy to electromagnetic energy most likely occurs within which of the following components?
- a. The x-ray tube
 - b. The CT Computer
 - c. The Detector System
 - d. The ADC

Ans. A

Ref. Episode 1, Slide 3

7. Which of the following components is primarily responsible for the geometry of the cone beam?
- a. The Pre-patient collimator
 - b. The Pre-detector collimator
 - c. The bow-tie filter
 - d. The DAC

Ans. B

Ref. Episode 1, Slide 4

8. Which of the following components is primarily responsible for determining scan field of view (SFOV)?
- a. The Pre-detector collimator
 - b. The ADC
 - c. The CT Computer
 - d. The Pre-patient collimator

Ans. D

Ref. Episode 1, Slide 4

9. Within which of the following components does reconstruction take place?
- a. The ADC
 - b. The DAC
 - c. The CT Computer
 - d. The Detector System

Ans. C

Ref. Episode 1, Slide 5

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10. Which of the following best describes where the functions of sampling, quantifying and coding take place?
- a. The ADC
 - b. The CT Computer
 - c. The DAC
 - d. The Detector System

Ans. A

Ref. Episode 1, Slide 5

11. The conversion of binary data to CT Numbers most likely occurs within which of the following components?
- a. The Detector System
 - b. The ADC
 - c. The CT Computer
 - d. The DAC

Ans. C

Ref. Episode 1, Slide 5

12. Within which of the following components are CT Numbers converted to electrical impulses?
- a. The CT Computer
 - b. The DAC
 - c. The ADC
 - d. The Detector System

Ans. B

Ref. Episode 1, Slide 6

13. Which of the following best describes the output from the Array Processor?
- a. Projection data
 - b. Electrical impulses
 - c. CT Numbers
 - d. The digital image

Ans. C

Ref. Episode 1, Slide 5

14. The ability to differentiate soft tissue structures based on their individual shade of gray is the definition for which of the following?
- a. Contrast resolution
 - b. Temporal resolution
 - c. Spatial resolution
 - d. Quantum mottle

Ans. A

Ref. Episode 2, Slide 4

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15. With regard to the production of scatter radiation, which of the following statements is true?

1. As field size increases, scatter decreases
 2. As kVp decreases, scatter increases
 3. As part thickness increases, scatter increases
 4. As mA increases, scatter decreases
- a. 1 through 4
 - b. 1, 2, 4
 - c. 3
 - d. 1, 3

Ans. C

Ref. Episode 2, Slide 8

16. *With regard to PIXEL, which of the following statements is true?

1. Pixels are what you look at on the monitor
 2. A PIXEL is composed of X, Y and Z axes
 3. Every pixel displays several shades of gray at the same time
 4. PIXEL is a contraction for picture element
- a. 1, 2, 3
 - b. 1, 3
 - c. 2, 4
 - d. 1, 4

Ans. D

Ref. Episode 2, Slide 10

17. *The data visible on the monitor most likely represents which of the following?

- a. Raw data
- b. Scan data
- c. Measurement data
- d. Image data

Ans. D

Ref. Episode 2, Slide 15

18. The anatomic position is best defined as “upright, facing forward with the palms also facing forward.”

- a. True
- b. False

Ans. A

Ref. Episode 2, Slide 21

SECTION 1 CE QUESTIONS
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19. The reduction in beam energy as the beam traverses the part is most likely the definition for which of the following?
- a. Scatter
 - b. Attenuation
 - c. Ionization
 - d. Absorption

Ans. B

Ref. Episode 2, Slide 26

20. With regard to attenuation, which of the following statements is true?
1. As Z increases, attenuation increases
 2. As part density increases, attenuation increases
 3. As part thickness decreases, attenuation decreases
 4. As kVp decreases, attenuation increases
- a. 1 through 4
 - b. 4
 - c. 1, 2, 3
 - d. 2, 3

Ans. A

Ref. Episode 2, Slide 25

21. The imaging plane that divides the body into equal anterior and posterior portions is most likely which of the following?
- a. The Coronal plane
 - b. The Mid-sagittal plane
 - c. The Mid-axial plane
 - d. The Mid-coronal plane

Ans. D

Ref. Episode 2, Slide 22

22. Which of the following statements is true?
1. The wider the window, the longer the scale, the grayer the image
 2. The wider the window, the shorter the scale, the grayer the image
 3. The narrower the window, the shorter the scale, the more black & white the image
 4. The narrower the window, the longer the scale, the less black & white the image
- a. 1 through 4
 - b. 1, 3
 - c. 2, 3

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d. 2, 4

Ans. B

Ref. Episode 2, Slide 16

23. Which of the following is, specifically, a CT contraindication?

1. Obesity
2. Pregnancy
3. CAD
4. Allergy to IV contrast media
5. Presbycusis

- a. 1 through 5
- b. 1, 3, 5
- c. 2, 4
- d. 2, 3, 4

Ans. C

Ref. Episode 2, slide 40

24. *Helical CT is made possible by which of the following?

- a. 4th generation geometry
- b. Slip ring technology
- c. Constant incrementation
- d. Continuous x-ray output

Ans. B

Ref. Episode 2, Slide 39

25. *The kidney, liver and spleen are soft tissue structures with similar attenuation characteristics.

Visually, how can they best be seen differentiated from one another?

- a. Decrease the mAs
- b. Increase the kVp
- c. View the image data with a narrow window
- d. View the raw data with a wide window

Ans. C

Ref. Episode 2, Slide 18

*With regard to the general segments of the CT Imaging Process, please match the columns below.
Answers can be used once, more than once or not at all.

26. _____ Image Display a. provided by the CT Computer

27. _____ Data Acquisition b. provided by the monitor

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28. ____ Image Reconstruction c. provided by the scanner

Ans. 26. B 27. C 28. A

Ref. Episode 2, Slide 37

29. The addition or subtraction of an electron from a shell of an atom is most likely the definition of which of the following?

- a. Excitation
- b. Ionization
- c. Annihilation
- d. Oxidation

Ans. B

Ref. Episode 3, Slide 11

30. ____ All electromagnetic types of radiation possess mass.

- a. true b. false

31. ____ Relative biological effectiveness (RBE) is a function of mass and ionic charge.

- a. true b. false

32. ____ X-ray, Gamma and Beta particles have a Quality Factor of 1.

- a. true b. false

33. ____ All particulates travel at c or they do not exist.

- a. true b. false

34. ____ Short wavelength and high frequency are related to high energy.

- a. true b. false

35. ____ Considering all radiations, Alpha particles are the most penetrating.

- a. true b. false

Ans. 30. B; 31. A; 32. A; 33. B; 34. A; 35. B

Ref. Episode 3, Slides 4 & 5

36. Which of the following interaction events is most responsible for patient dose?

SECTION 1 CE QUESTIONS
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- a. Photoelectric effect
- b. Compton scatter
- c. Characteristic radiation
- d. any ionization event

Ans. A

Ref. Episode 3, Slide 11

37. *The scan mode where multiple acquisitions covering the same body area is accomplished is most likely which of the following?

- a. Axial
- b. Helical
- c. Topographical
- d. Dynamic

Ans. D

Ref. Episode 3, Slide 20

38. Which of the following is the interaction event that occurs as a result of the removal of an outer orbital electron?

- a. Compton scatter
- b. Characteristic radiation
- c. Photoelectric effect
- d. Pair Production

Ans. A

Ref. Episode 3, Slide 9

39. A rotate only, fan beam system would most likely be which of the following?

- a. 4th generation
- b. 3rd generation
- c. 2nd generation
- d. 1st generation

Ans. A

SECTION 1 CE QUESTIONS
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Ref. Episode 3, Slide 17

40. Tube Current Modulation along the Z axis best describes which of the following?

- a. ECG based
- b. Organ based
- c. Longitudinal based
- d. Angular based

Ans. C

Ref. Episode 3, Slide 34

41. Which of the following beam geometries is described as “like that of a laser pointer?”

- a. Fan Beam
- b. Pencil Beam
- c. Area Beam
- d. Cone Beam

Ans. B

Ref. Episode 3, Slide 31

42. Which of the following is a characteristic of Conventional Axial CT?

- 1. No interpolation is required
 - 2. Axial slices are individually obtained
 - 3. Continuous table movement during exposure is the key
 - 4. Resolution is superior compared to Helical
- a. 4
 - b. 3
 - c. 2, 3
 - d. 1, 2, 4

Ans. D

Ref. Episode 3, Slide 21

43. Which of the following is impacted by Windmill Artifact?

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1. 1st generation
2. 2nd generation
3. 3rd generation
4. 4th generation
5. 5th generation

- a. 1 through 5
- b. 1, 2
- c. 3, 4
- d. 5

Ans. C

Ref. Episode 3, Slide 27, 28

44. The reduction in beam energy as the beam traverses the part is most likely the definition of which of the following?

- a. Attenuation
- b. Classical scatter
- c. Absorption
- d. Low contrast detectability (LCD)

Ans. A

Ref. Episode 3, Slide 15

45. Volume acquisitions are acquired with which of the following?

- a. Dynamic mode
- b. Helical mode
- c. Axial mode
- d. Topogram mode

Ans. B.

Ref. Episode 3, Slide 21

46. Of those listed, with which of the following is the detector ring most notably stationary?

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- a. 6th generation dual source scanner
- b. 3rd generation
- c. The EBCT scanner
- d. 4th generation

Ans. D

Ref. Episode 3, Slide 17

47. Which of the following is the most important component of the interscan delay?

- a. breathing instructions
- b. indexing the table to the next slice location
- c. selecting slice thickness
- d. calculating the reconstruction interval

Ans. B

Ref. Episode 3, Slide 21

48. Which of the following best represents the source of x-ray photons?

- a. the tube
- b. the focal track
- c. the target
- d. the focal spot

Ans. D

Ref. Episode 4, Slide 7

49. Which of the following is a characteristic of a family member of the Electromagnetic Spectrum?

1. travels at the speed of light or does not exist
2. does not possess mass
3. does not possess electrical charge
4. has mass
5. possesses either a + or – electrical charge

a. 1 through 5

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- b. 4, 5
- c. 1, 2, 3
- d. 1, 3, 4

Ans. C

Ref. Episode 4, Slide 3

50. Which of the following is an x-ray production process that is also an ionization event?

- a. Bremsstrahlung
- b. Photoelectric effect
- c. Characteristic
- d. Compton scatter

Ans. C

Ref. Episode 4, Slide 24

51. Maintaining the electron cloud is the function of which of the following x-ray tube components?

- a. The filament
- b. The focus cup
- c. The target
- d. The rectifier

Ans. B

Ref. Episode 4, Slide 5

52. *The total quantity of thermionic emission is controlled by which of the following technical factors?

- a. mA
- b. mAs
- c. kVp
- e. Time

Ans. A

Ref. Episode 4, Slide 15

53. Which of the following components is the positive terminal?

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- a. Cathode
- b. Anode
- c. Envelope
- d. Target

Ans. B

Ref. Episode 4, Slide 7

54. From which of the following units are Heat Units derived?

- a. mAs
- b. kVp
- c. Joule
- d. Quanta

Ans. C

Ref. Episode 4, Slide 12

55. Boosting volts to kilovolts is the function of which of the following circuit components?

- a. Autotransformer
- b. Filament transformer
- c. Rectification system
- d. High tension transformer

Ans. D

Ref. Episode 4, Slide 19

56. Which of the following is characteristic of tungsten?

- 1. Atomic number is 74
 - 2. Melting point is 3422 C
 - 3. Excellent electrical conductor
- a. 1 through 3
 - b. 1, 2
 - c. 2, 3

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d. 2

Ans. A

Ref. Episode 4, Slide 28

57. Calculate the Heat Units generated when the following technical factors are used for a CT procedure:

400 mA, 120 kVp, 8 second exposure, Single phase HF Generator, PITCH = 1.2, Bone algorithm

- a. 541,440 HU
- b. 541,440 cm
- c. 541,440 mm
- d. 541,440 mAs

Ans. A

Ref. Episode 4, Slide 27

58. Which of the following is the component responsible for converting EM energy to electrical impulses?

- a. The detector system
- b. The ADC
- c. The CT Computer
- d. The DAC

Ans. A

Ref. Episode 5, Slide 2

59. Which of the following determines the SFOV?

- a. The ADC
- b. The Pre-detector collimator
- c. The CT Computer
- d. The Pre-patient collimator

Ans. D

Ref. Episode 5, Slide 18

60. *With regard to the relationship between slice thickness and resolution, which of the following statements is true?

1. As slice thickness decreases, spatial resolution increases

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- 2. As slice thickness increases, contrast resolution increases
- 3. As slice thickness decreases, temporal resolution increases

- a. 1 through 3
- b. 1, 2
- c. 2
- d. 3

Ans. B

Ref. Episode 5, Slide 22

61. Which of the following is the solution to remediating Partial Volume Effect?

- a. Increase mAs
- b. Reduce slice thickness
- c. Increase slice thickness
- d. Decrease PITCH

Ans. B

Ref. Episode 5, Slide 23

62. The process of filtering Raw Data to create Image Data is a function of which of the following components?

- a. The DAC
- b. The ADC
- c. The CT Computer
- d. The Detector System

Ans. C

Ref. Episode 5, Slide 28

63. *Which of the following components is located after the Array Processor but before the display monitor?

- a. The DAC
- b. The ADC
- c. The CT Computer

SECTION 1 CE QUESTIONS
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d. The Detector System

Ans. A

Ref. Episode 5, Slide 33

64. The CT NUMBER data received by a matrix after RECONSTRUCTION is an example of which of the following?

- a. Filtered Back Projection Data
- b. Convolved Data
- c. Raw Data
- d. Measurement Data

Ans. A

Ref. Episode 6, Slide 22

65. Which of the following is a reconstruction algorithm?

- 1. Iterative reconstruction
 - 2. Fourier Transform
 - 3. Interpolation
 - 4. MPR
 - 5. Filtered Back Projection
 - 6. 3D
- a. 1 through 6
 - b. 1, 2, 3, 4
 - c. 4, 6
 - d. 1, 2, 3, 5

Ans. D

Ref. Episode 6, Slide 11

66. Which of the following is a mathematical technique used to estimate the value of a function from known values on either side of the function?

- a. Interpolation
- b. Extrapolation

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- c. Volume Averaging
- d. Partial Volume Artifact

Ans. A

Ref. Episode 6, Slide 14

67. Which of the following defines the degree of OVERLAP between reconstructed axial images?

- a. Slice thickness
- b. The Pre-Patient Collimator
- c. The DFOV
- d. The Reconstruction Interval

Ans. D

Ref. Episode 6, Slide 18

68. For cardiac imaging which percentage of overlap is generally utilized?

- a. 25%
- b. 50%
- c. 75%
- d. 85%

Ans. B

Ref. Episode 6, Slide 19

69. Reconstructing 1 mm thick slices at 0.5 mm is an example of what percentage of overlap?

- a. 70%
- b. 50%
- c. 30%
- d. 20%

Ans. B

Ref. Episode 6, Slide 19

70. The most common reconstruction method used in modern CT is most likely which of the following?

- a. Iterative Reconstruction

SECTION 1 CE QUESTIONS
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- b. Extrapolation
- c. Filtered Back Projection
- d. Fourier Transform

Ans. C

Ref. Episode 6, Slide 22

71. Which of the following is a reconstruction algorithm that is a mathematical function that converts a signal in the Spatial Domain to a signal in the Frequency Domain?

- a. Iterative Reconstruction
- b. Extrapolation
- c. Filtered Back Projection
- d. Fourier Transform

Ans. D

Ref. Episode 6, Slide 24

72. *In CT, the Axial Plane is defined by which of the following orthogonal axis?

- 1. X
 - 2. Y
 - 3. Z
-
- a. 1, 2
 - b. 1, 3
 - c. 3
 - d. 1, 2, 3

Ans. A

Ref. Episode 6, Slide 21

73. Which of the following is a digital imaging processing technique that employs the application of kernels to modify an image?

- a. Fourier transform
- b. Iterative reconstruction
- c. MPR

SECTION 1 CE QUESTIONS
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d. Convolution

Ans. D

Ref. Episode 6, Slide 7

74. With regard to Multiplanar Reformation (MPR), which of the following statements is true?

1. MPR quality depends on the quality of the initial data set
2. The reformatting of original data sets into additional planes defines MPR
3. It is not possible to routinely visualize structures that run oblique courses with MPR
4. With MPR, the thinner the slice, the better the spatial resolution

a. 1 through 4

b. 4

c. 2, 4

d. 1, 2, 3

Ans. A

Ref. Episode 7, Slide 4

75. The generation of a 3D object using computer software best defines which of the following?

- a. Rendering
- b. 3D Rendering
- c. Modeling
- d. Reconstruction

Ans. C

Ref. Episode 7, Slide 18

76. Due to which of the following vision capabilities do images appear 3D?

- a. Diplopia
- b. Visual acuity
- c. Depth perception
- d. Background analysis

Ans. C

SECTION 1 CE QUESTIONS
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Ref. Episode 7. Slide 15

77. Which of the following is an example of the process of 3D Rendering?

1. Shaded Surface Display
 2. VR
 3. MIP
 4. Min IP
- a. 3, 4
 - b. 1, 2, 3
 - c. 1, 2
 - d. 1, 2, 3, 4

Ans. D

Ref. Episode 7, Slide 14

78. That the algorithm would display only those tissues with the greatest attenuation for viewing exemplifies which of the following?

- a. Shaded Surface Display
- b. Volume Rendering
- c. Maximum Intensity Projection
- d. 3D Rendering

Ans. C

Ref. Episode 7, Slide 22

79. The “string of beads” artifact is most closely associated with which of the following?

- a. MIP
- b. SSD
- c. VR
- d. MinIP

Ans. A

Ref. Episode 7, Slide 25

SECTION 1 CE QUESTIONS
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80. Which of the following 3D Rendering techniques is best for visualizing vascular structures?

- a. MIP
- b. SSD
- c. VR
- d. MinIP

Ans. C

Ref. Episode 7, Slide 43

81. *Which of the following is a vessel used for CT calcium scoring?

- 1. The Cardiac Vein
 - 2. The Left Anterior Descending Artery
 - 3. The Left Main Coronary Artery
 - 4. The Right Main Coronary
 - 5. The Left Circumflex Vein
- a. 1, 2, 5
 - b. 2, 3, 4
 - c. 3, 4, 5
 - d. 3, 4

Ans. C

Ref. Episode 7, Slide 48

82. The fraction of outbound blood pumped with each heartbeat is the definition for which of the following?

- a. Stroke Volume
- b. End Systolic Volume
- c. Ejection Fraction
- d. End Diastolic Volume

Ans. C

Ref. Episode 7, Slide 49

SECTION 1 CE QUESTIONS
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83. Moderate evidence of CAD would be best indicated by which of the following CT Calcium Scores?

- a. 350
- b. 150
- c. 15
- d. 95

Ans. B

Ref. Episode 7, Slide 46

84. Relative to voxel size, which of the following statements is true?

- a. As slice thickness increases, voxel size increases
- b. As matrix size increases, voxel size increases
- c. As Scan Field of View increases, voxel size decreases
- d. As Display Field of View decreases, voxel size increases

Ans. A

Ref. Episode 8, Slide 5

85. With regard to pixel, which of the following statements is true?

- 1. As matrix size increases, pixel size decreases
 - 2. Pixels are comprised of X and Y axes only
 - 3. Pixels are seen when viewing the monitor
 - 4. Each pixel portrays one gray shade at a time
 - 5. As pixel size increases spatial resolution decreases
- a. 1 through 5
 - b. 1, 5
 - c. 2, 3, 4
 - d. 1, 2, 4

Ans. A

Ref. Episode 8, Slide 4

SECTION 1 CE QUESTIONS
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86. A RANGE OF CT NUMBERS THAT ARE DISPLAYING PARTICULAR SHADES OF GRAY is the definition for Window Width.

- a. true b. false

Ans. A

Ref. Episode 8, Slide 10

87. *Which of the following statements is true?

1. The wider the width the longer the scale
2. The narrower the width the shorter the scale
3. Values higher than the selected range will be white
4. Values lower than the selected range will be black

- a. 1 through 4
b. 1 & 2
c. 3 & 4
d. 2 & 3

Ans. A

Ref. Episode 8, Slides 11 & 14

88. If the selected window width is 200, and the selected window level is 50, which range of Hounsfield Units would be displayed on the image as shades of gray?

- a. -100 to 200
b. -50 to 150
c. -150 to 250
d. 250 to -250

Ans. B

Ref. Episode 8, Slide 13

89. The AREA FROM WHICH TRANSMISSION MEASUREMENTS ARE RECORDED DURING SCANNING is the Scan Field of View.

- a. true b. false

Ans. A

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Episode 8, Slide 28

90. Within which of the following components is electromagnetic energy converted to electrical impulses?

- a. The DAC
- b. The ADC
- c. The Detector Array
- d. The CT Computer

Ans. C

Episode 9, Slide 4

91. From which component in the CT Imaging Chain is the end result the assignment of a binary digit to the coded sample?

- a. The DAC
- b. The ADC
- c. The Detector Array
- d. The CT Computer

Ans. B

Episode 9, Slide 5

92. Which of the following is a factor that impacts CT Uniformity?

- 1. Scatter radiation
 - 2. Beam Hardening
 - 3. Electronic fluctuations
- a. 1 through 3
 - b. 1, 2
 - c. 2, 3
 - d. 3

Ans. A

Ref. Episode 9, Slide 9

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93.* Defining the relationship between the CT Number and the Linear Attenuation Coefficient of the object imaged best defines which of the following?

- a. Uniformity
- b. Low Contrast Resolution
- c. Linearity
- d. Effective density

Ans. C

Ref. Episode 9, Slide 7

94. THE SHARPNESS OF THE CT IMAGE AS DEFINED IN LINE PAIRS PER CENTIMETER is the definition for which of the following?

- a. Contrast resolution
- b. Spatial resolution
- c. Temporal resolution
- d. Low contrast detectability

Ans. B

Episode 9, Slide 15

95. Spatial Resolution increases when:

- 1. Focal spot size increases
 - 2. Detector cell size decreases
 - 3. Scanner geometry increases
 - 4. Sampling frequency decreases
- a. 1 through 4
 - b. 1, 4
 - c. 2, 3
 - d. 1, 2

Ans. C

Episode 9, Slide 18

96.* Solving for Pixel Size is best accomplished with which of the following equations?

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- a. FOV / Matrix (squared)
- b. FOV (squared) x Matrix
- c. FOV x Matrix
- d. FOV / Matrix

Ans. D

Episode 9, Slide 21

97. With regard to Temporal Resolution, which of the following statements is true?

- 1. As Gantry Speed increases, Data Acquisition time decreases
 - 2. As PITCH increases, Data Acquisition time decreases
 - 3. As Detector Coverage increases, Data Acquisition time decreases
- a. 1 through 3
 - b. 1, 2
 - c. 2, 3
 - d. 1, 3

Ans. A

Ref. Episode 9, Slide 28

98. Which of the following is the first CT system to employ an advanced system of Pre- and Post-patient collimation?

- a. 2nd generation
- b. 3rd generation
- c. 4th generation
- d. Dual source systems

Ans. B

Episode 10, Slide 35

99. Which of the following is a primary component of the Data Acquisition System?

- 1. The beam shaping filter
- 2. The detector system

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3. The DAC
4. The CT Computer
5. The ADC

- a. 1 through 5
- b. 2, 5
- c. 1, 3, 4
- d. 2, 4, 5

Ans. B

Episode 10, Slide 53

100. In a MDCT system, which of the following is a component that controls slice thickness?

1. The beam shaping filter
2. The Pre-patient collimator
3. The detector system
4. The Pre-detector collimator
5. The DAC

- a. 1 through 5
- b. 3, 5
- c. 2, 4
- d. 3, 4

Ans. C

Episode 10, Slide 18