



21. Regarding image processing hardware, the external image processor is responsible for high-speed processing of the input digital data.  
A True B False

## CHAPTER FOUR: PHYSICAL PRINCIPALS OF CT

22. The immediate goal of tomography is to eliminate structures \_\_\_\_\_ the focused section.  
A only above B only below C above and below D to the sides of
23. Regarding CT radiation beams, a heterogeneous beam is also known as a \_\_\_\_\_ beam.  
A differentiated B variable C monochromatic D polychromatic
24. Conversion of attenuation readings into a CT image is accomplished with what is called \_\_\_\_\_ algorithms.  
A recurring B reconstruction C reassembling D simple
25. The original CT images were composed of a(n) \_\_\_\_\_ matrix for a total of 6400 pixels.  
A 320 X 20 B 128 X 50 C 100 X 64 D 80 X 80
26. The pixel size in a CT image can be computed with the FOV (field of view) and matrix size as follows: pixel size equals:  
A matrix size/FOV B FOV/matrix size C FOV x matrix size D FOV/matrix size/2

## CHAPTER FIVE: DATA ACQUISITION CONCEPTS

27. \_\_\_\_\_ generation scanners were based on the fan beam geometry and translate-rotate motion.  
A First B Second C Third D Fourth
28. First generation CT scanners took at least \_\_\_\_\_ minutes to produce a complete scan of the patient.  
A 2 to 2.5 B 3 C 3.5 D 4.5 to 5.5
29. The sixth generation, dual source CT scanner consists of two xray tubes and two sets of detectors that are offset by \_\_\_\_\_ degrees.  
A 90 B 45 C 55 D 70
30. CT scanners use \_\_\_\_\_ phase power for the efficient production of xrays.  
A two B four C five D three
31. The working life of an CT x-ray tube can range from \_\_\_\_\_ hours.  
A 10,000 to 40,000 B 1,000 to 4,000 C 100 to 400 D 100,000 to 400,000
32. Filtration of the xray beam increases the mean energy, making it more monochromatic. This is referred to as \_\_\_\_\_ of the beam.  
A softening B stretching C hardening D disruption
33. The detector in a CT scanner measures the transmitted xrays from the patient and converts them into \_\_\_\_\_ energy.  
A kinetic B electrical C mechanical D thermal

## CHAPTER SIX: IMAGE RECONSTRUCTION

34. To construct a single CT image, the xray tube and detectors must rotate around the patient for at least \_\_\_\_\_ degrees.  
A 45 B 90 C 135 D 180
35. \_\_\_\_\_ is a digital image processing technique to modify images through a filter function.  
A Interpolation B Convolution C Attenuation D Differentiation
36. \_\_\_\_\_ are the result of preprocessed scan data and are subjected to the image reconstruction algorithm used by the scanner.  
A axial images B 3D images C 2D images D raw data
37. The beam emitted from a four-detector row MSCT scanner is called a \_\_\_\_\_ beam.  
A cone B cylinder C tube D linear

## CHAPTER SEVEN: BASIC INSTRUMENTATION

38. The computer system receives \_\_\_\_\_ data from the DAS and processes it to reconstruct an image of the cross-sectional anatomy.  
A digital B raw C preprocessed D short
39. The \_\_\_\_\_ is a mounted framework that surrounds the patient in a vertical plane.  
A generator B xray tube C gantry D patient table
40. \_\_\_\_\_ are programs that control the hardware components and the overall operation of the computer.  
A Operating systems B Convolution processor C Reconstruction processor D Preprocessing unit
41. The \_\_\_\_\_ allows system parameters such as scan setup and control parameters to be actuated without typed keyboard commands.  
A floating keyboard B touch panel C image display D optical disk drive

## CHAPTER EIGHT: IMAGE POSTPROCESSING AND VISUALIZATION TOOLS

42. The range of the CT numbers in the image is referred to as the window:  
A height B circumference C diameter D width
43. Air is assigned a CT number of:  
A 1,000 B 500 C -500 D -1,000
44. Preset windows are available on scanners to \_\_\_\_\_ windowing.  
A optimize B increase C eliminate D reduce the need to learn
45. The sagittal image defines a plane that divides the body into \_\_\_\_\_ sections.  
A top and bottom B front and back C right and left D diagonal
46. 3D imaging in CT belongs to a class of digital image processing referred to as image:  
A combination B synthesis C integration D meshing
47. Regarding resolution factors, operators may use a small xray focal spot. This offers a lower tube current with higher spatial resolution.  
A True B False
48. Although radiography can discriminate a density difference of about 10%, CT can do the accomplish the same from:  
A 0.8% to 1.2% B 1% to 2% C 7% to 8% D 0.25% to 0.5%
49. \_\_\_\_\_ resolution is an indication of a CT scanner's ability to freeze motions of the scanned object.  
A Permanent B Temporal C Close gap D Quick
50. Regarding cardiac CT, the advantage of prospective gating is the \_\_\_\_\_ for the patient.  
A reduction in xray dose B faster scan time C shorter breath-hold times D resultant lower cost
51. A(n) \_\_\_\_\_ is a distortion or error in an image that is unrelated to the subject being studied.  
A image noise B scattered xray C image streak D artifact
52. \_\_\_\_\_ artifacts often appear near objects of high densities and can be caused by beam hardening, partial volume averaging, etc.  
A Electrical B Branch C Shading D Spot
53. \_\_\_\_\_ artifacts are caused by incomplete or insufficient projection samples as a result of the cone-beam geometry of multislice CT.  
A Scatter B Shading C Cone-beam D Noise-induced

## CHAPTER TEN: RADIATION DOSE IN CT

54. The radiation dose refers to the amount of energy \_\_\_\_\_ the patient.  
A that passes through B that enters C absorbed by D that exits
55. \_\_\_\_\_ effects are those effects for which the probability of the effect occurring depends on the dose.  
A Deterministic B Stochastic C Latent D Chance
56. A(n) \_\_\_\_\_ is an instrument used to accurately quantify radiation exposure.  
A radiation badge B ionization chamber C control panel D intensifier
57. The \_\_\_\_\_ determines the penetrating power of the photons coming from the xray tube.  
A constant mAs B effective mAs C mGy/mAs D kVp
58. AEC (automatic exposure control) is \_\_\_\_\_ on CT scanners.  
A now commonplace B not possible C no longer utilized D in development
59. In CT, ATCM (automatic tube current modulation) refers to the automatic control of the mA in \_\_\_\_\_ directions of the patient.  
A two B three C four D five
60. To reduce the noise in an image by a factor of 2 requires an increase in the dose by a factor of:  
A 2 B 3 C 4 D 5

## CHAPTER ELEVEN: SINGLE-SLICE SPIRAL / HELICAL CT...

61. Regarding conventional CT, some degree of anatomy may be missed due to inconsistent levels of inspiration – called slice-to-slice:  
A misrepresentation B misalignment C misregistration D mismeasurement

62. In volume scanning, transporting the patient too quickly through the scanner leads to image degradation caused by:  
 A fogging                      B motion artifacts                      C inaccurate data                      D scatter radiation
63. The xray tube and detectors rotate \_\_\_\_\_ during data collection.  
 A once per second                      B twice per second                      C five times per second                      D continuously

64. During a scan, the volume coverage equals pitch times:  
 A slice thickness                      B scan time                      C gantry angulation                      D kVp

65. In a CT scan, collimation determines:  
 A table speed                      B patient dose                      C slice thickness                      D noise level

## CHAPTER TWELVE: MULTISLICE SPIRAL / HELICAL CT...

66. In a scanner, the radiation sensors convert xray photons to:  
 A electrical energy                      B heat                      C light                      D an image

67. In a scanner, the photodiodes convert light into:  
 A an image                      B electrical current                      C heat                      D mechanical energy

68. Compared with single-slice volume CT, the dual-slice whole-body fan-beam CT reduces scan time by \_\_\_\_\_ %.  
 A 15                      B 25                      C 40                      D 50

69. Regarding beam geometry, the beam becomes \_\_\_\_\_ as the number of detector rows in a multirow detector array increases.  
 A wider                      B more narrow                      C longer                      D shorter

70. In multislice CT, the z-gap is determined by the pitch and by the:  
 A gantry angulation                      B table speed                      C detector row spacing                      D collimation

71. \_\_\_\_\_ describes the number of data collection channels and the effective section thickness determined by the DAS setting.  
 A linear array detectors                      B rebinning                      C detector configuration                      D fixed-array detectors

72. When the slice thickness is equal to the pixel size, all dimensions of the voxel are equal. The data set acquired is said to be:  
 A anisotropic                      B isotropic                      C nonisotropic                      D nonanisotropic

73. The first model of the 256-slice 4D scanner was developed in:  
 A Brazil                      B the US                      C Sweden                      D Japan

## CHAPTER THIRTEEN: OTHER TECHNICAL APPLICATIONS OF CT...

74. CT \_\_\_\_\_ is the use of CT in obtaining 3D imaging of vascular structures with an intravenous injection of contrast medium.  
 A interventional radiology                      B arthroscopy                      C IVP                      D angiography

75. CTA (computed tomographic angiography) is a 3D examination. Overlying structures may be eliminated by:  
 A postprocessing                      B utilizing an optimal kVp level                      C special software in real-time                      D certain positioning techniques

76. \_\_\_\_\_ refers to the viewing and evaluation of the images in the axial data set by panning through the set of images.  
 A CT fluoroscopy                      B Interactive cine                      C CT angiography                      D Multiplanar reconstruction

77. Operators standing in the CT room during the procedure must wear protective apparel of at least \_\_\_\_\_ mm lead equivalent.  
 A 0.05                      B 0.1                      C 0.5                      D 0.9

78. CT \_\_\_\_\_ is a geometric simulation process that provides beam arrangements and treatment fields without any dosimetric information.  
 A arranging                      B miming                      C simulation                      D preplanning

79. Regarding the process referred to in question 78, image registration occurs \_\_\_\_\_ image fusion.  
 A before                      B after                      C during                      D in lieu of

80. Before the actual CT scan is performed, a(n) \_\_\_\_\_ must be obtained as a prescan localization image.  
 A scout view                      B initial axial image                      C ultrasound                      D CTA

## CHAPTER FOURTEEN: THREE-DIMENSIONAL CT...

81. The purpose of 3D imaging is to use the vast amounts of data collected from the patient to provide \_\_\_\_\_ information.  
 A only qualitative                      B only quantitative                      C no qualitative / quantitative                      D qualitative and quantitative

82. The generation of a 3D object using computers is called:  
 A shading                      B modeling                      C lighting                      D transforming

83. \_\_\_\_\_ is a computer program that converts the anatomical data collected from the patient into the 3D image on the computer screen.  
 A Modeling B Shading C Rendering D Lighting
84. With patient motion, final 3D images can have the appearance of step-like contours known as the \_\_\_\_\_ artifact.  
 A ridged B escalator C erosion D stairstep
85. Regarding volume rendering, one purpose of \_\_\_\_\_ is to assign different brightness levels or color.  
 A rendering B preprocessing C shading D transformation
86. Virtual endoscopic images are based on both 2D and 3D CT image data sets by using a technique known as \_\_\_\_\_ volume rendering.  
 A perspective B vantage C panorama D context
87. Regarding stand-alone workstation 3D processing techniques, \_\_\_\_\_ allows two tissue types to be viewed at the same time.  
 A disarticulation B virtual reality imaging C slice plane mapping D surface / volume rendering

### CHAPTER FIFTEEN: VIRTUAL REALITY IMAGING

88. A typical CT colonoscopy imaging examination may generate \_\_\_\_\_ images.  
 A about 200 B about 400 C about 500 D over 1,000
89. 4D angiography provides 3D images with a fourth dimension, opacity.  
 A True B False
90. With virtual bronchoscopy, the viewing direction is unrestricted. However, with real bronchoscopy, only \_\_\_\_\_ views are possible.  
 A lateral B back C superior / inferior D frontal

### CHAPTER SIXTEEN: POSITRON EMISSION TOMOGRAPHY / CT SCANNERS

91. A positron has the same mass as a(n) \_\_\_\_\_ but a positive rather than a negative charge.  
 A neutron B proton C electron D quark
92. After a positronium annihilates, the resulting photon pair's energy may be determined by using Einstein's equation - which is:  
 A  $E=mc^2$  B  $E=m^2c$  C  $E=mc$  D  $E=m^2c^2$
93. Regarding correcting for PET scan emission imaging, an initial \_\_\_\_\_ scan is needed to acquire a transmission scan.  
 A scout B blank C reference D zero
94. Hybrid PET/CT scanners were introduced in:  
 A the 1980s B the 1990s C 2001 D 2002
95. In a PET/CT scan, the CT scan is acquired first and can take less than one minute. However, the PET scan can take \_\_\_\_\_ to acquire.  
 A 5 to 10 minutes B 12 to 18 minutes C 20 to 40 minutes D 1 to 2 hours

### CHAPTER SEVENTEEN: CT OF THE HEAD, CEREBRAL VESSELS...

96. When a traumatic brain or facial injury is suspected, CT provides rapid information about contusions. A contusion is a:  
 A brain bleed B cerebral blood clot C type of stroke D brain bruise
97. Orbital CT scan images should always be available in at least two planes, transverse and:  
 A coronal B sagittal C axial D horizontal
98. A delay of \_\_\_\_\_ between injection and acquisition of images of the entire brain increases visualization of the jugular veins.  
 A 1 hour B 30 minutes C 2 minutes D a few seconds
99. Enlargement of the \_\_\_\_\_ gland as a result of a goiter is a frequent incidental finding when the neck is imaged for any reason.  
 A pineal B thyroid C thymus D pituitary
100. In the vast majority of CT exams, the patient is required to lie in a \_\_\_\_\_ position.  
 A prone B supine C left lateral D semi-rotated
101. In imaging the neck, \_\_\_\_\_ is used help distinguish blood vessels from lymph nodes.  
 A barium B IV contrast C simethicone D hyoscyamine

### CHAPTER EIGHTEEN: CT OF THE BODY

102. Almost all mediastinal abnormalities detected on chest radiographs (typically suspected masses) can be confirmed with:  
 A ultrasound B nuclear medicine C CT D fluoroscopy

103. CT can reliably identify significant coronary stenosis in vessels as small as \_\_\_\_\_ with a sensitivity of 94% to 95%.  
 A 4mm                                      B 3.2mm                                      C 2.1mm                                      D 1.5mm
104. The \_\_\_\_\_ is the most commonly injured solid organ in the abdomen, which is commonly diagnosed with contrast-enhanced CT.  
 A spleen                                      B liver                                      C stomach                                      D gallbladder
105. Angiomyolipomas have a characteristic CT appearance demonstrating areas of \_\_\_\_\_ attenuation.  
 A bony                                      B fatty                                      C air pocket                                      D watery
106. \_\_\_\_\_ has largely replaced standard catheter angiography for the diagnosis of peripheral vascular disease.  
 A CT calcium scoring                      B CT enterography                      C CT angiogram (CTA)                      D PET/CT
107. Regarding IV CT exams, a mechanical injector is mandatory for the use of injection rates as high as \_\_\_\_\_ ml per second.  
 A 1 or 2                                      B 3 or 4                                      C 5 or 6                                      D 0.5
108. According to the text, using renal CT to further characterize a renal mass or to stage a tumor is best done with a \_\_\_\_\_ phase study.  
 A single-                                      B two-                                      C three-                                      D four-

## CHAPTER NINETEEN: PEDIATRIC CT

109. With MDCT sedation is \_\_\_\_\_ required for routine head and sinus studies, where some motion is tolerable.  
 A never                                      B always                                      C most of the time                                      D rarely
110. The dose of contrast material for children is 2 to 3 ml/kg to a maximum of \_\_\_\_\_ ml.  
 A 150                                      B 200                                      C 250                                      D 350
111. Pediatric exams of the head, neck, and spine are routinely performed with CT or MRI except for the neonate, where \_\_\_\_\_ is used.  
 A PET/CT                                      B ultrasound                                      C nuclear medicine                                      D fluoroscopy
112. Placing the patient \_\_\_\_\_ may be less intimidating for young children.  
 A feet first                                      B head first                                      C prone                                      D on the side
113. \_\_\_\_\_ CT exams can be used to evaluate renal stones.  
 A Three-phase                                      B Noncontrast                                      C Barium                                      D IV contrast
114. Osseous infections are best evaluated using \_\_\_\_\_ or MRI.  
 A ultrasound                                      B plain radiographs                                      C bone scan                                      D CT
115. Regarding pediatric CTA, power injection with a rate of at least \_\_\_\_\_ ml per second is strongly recommended.  
 A 0.5                                      B 1                                      C 1.5                                      D 2

## CHAPTER TWENTY: QUALITY CONTROL FOR CT SCANNERS

116. Ideally, QC should be performed between each patient; however, it would be prudent to perform certain quick tests on a \_\_\_\_\_ basis.  
 A daily                                      B weekly                                      C bi-weekly                                      D monthly
117. In testing for CT number calibration, the expected results for the CT number of water should be:  
 A very close to zero                      B 100                                      C 500                                      D 1,000
118. In testing for low-contrast resolution, the minimum size of holes visualized \_\_\_\_\_ over the life of the scanner.  
 A should increase                      B should decrease                      C should not increase                      D will always fluctuate
119. In testing for hard copy output, adjust the display contrast so that both \_\_\_\_\_ patches are visible.  
 A 50% and 75%                      B 33% and 66%                      C 10% and 90%                      D 95% and 100%
120. In testing for light field accuracy, acceptance limits for the light field should be coincident with the radiation field to within 5mm.  
 A True                                      B False

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7	31	55	79	103
8	32	56	80	104
9	33	57	81	105
10	34	58	82	106
11	35	59	83	107
12	36	60	84	108
13	37	61	85	109
14	38	62	86	110
15	39	63	87	111
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18	42	66	90	114
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22	46	70	94	118
23	47	71	95	119
24	48	72	96	120