

**CHAPTER ONE: PATIENT CARE AND SAFETY**

1. ——— is the most effective way of explaining intangible concepts, as problem areas can be readily addressed and explained.  
A Written communication      B Verbal communication      C Email correspondence      D Telephone communication
2. Approximately ——— of our communication comes from nonverbal cues.  
A 10%                              B 60%                              C 50%                              D 90%
3. This is a written consent providing visible proof of a patient's wishes and it must be procured by the radiologist performing the procedure:  
A informed consent              B explicit consent              C direct consent              D implied consent
4. CT examinations requiring IV contrast must be scheduled ——— prior to a nuclear medicine thyroid scan, because it will inhabit the uptake of the radiopharmaceuticals.  
A 1 week                              B 12 weeks                              C 8 weeks                              D 4 weeks
5. ——— help(s) to reduce radiation dose to the patient from repeated scans because it limits patient motion.  
A Restraints                              B Immobilization                              C Sedation                              D Positioning devices
6. The level of consciousness when only vigorous and repeated stimuli will arouse the individual is called:  
A clouding                              B confusional state                              C stupor                              D lethargy
7. Syncope can be seen during:  
A normal breathing rate      B tachycardia                              C bradypnea                              D tachypnea
8. ——— indicates the pressure in the arteries when the heart rests between beats.  
A Systolic blood pressure      B Diastolic blood pressure      C Hydrostatic pressure      D Osmotic pressure
9. If a patient pulse oximetry is between 86-90%, he has:  
A normal oximetry              B mild hypoxia                              C moderate hypoxia              D severe hypoxia
10. Creatinine values more than ——— indicate renal impairment  
A 1.3 mg/dl                              B 0.3 mg/dl                              C 0.5 mg/dl                              D 1 mg/dl
11. ——— is the best test to measure kidney function and to determine stages of kidney disease.  
A Calcium                              B Creatinine                              C GFR                              D BUN
12. A ——— test is of clinical use when there is a suspicion of deep venous thrombosis (DVT) or pulmonary embolism.  
A Partial thromboplastin time      B D-dimer                              C prothrombin time              D Platelet
13. Individuals taking ——— must abstain from its use for 2 days following the enhanced CT examination because of the risk of renal impairment.  
A warfarin                              B enalapril                              C aminotransferase              D metformin
14. A small glass vial that is sealed after filling and used chiefly as a container for a hypodermic injection solution is called a(n):  
A vial                              B bolus                              C ampule                              D vessel
15. IV contrast media will be eliminated through the:  
A sweat                              B urine                              C stool                              D tears
16. ——— is the measurement of the total number of particles in the contrast solution per kilogram of water.  
A Osmolarity                              B Viscosity                              C Osmolality                              D Dosing



33. The ——— quantifies the risk from partial-body exposure to that from an equivalent whole-body dose.
- A multiple slice average dose    B size specific dose estimate    C absorbed dose    D effective dose
34. ——— is a newer CT measurement that incorporates patient size as a variable correction factor to better estimate patient dose.
- A Multiple slice average dose    B Size specific dose estimate    C Absorbed dose    D Effective dose
35. According to radiation protection principle, using the ALARA principle without degrading image quality is part of:
- A justification    B optimization    C dose limitation    D separation
36. ——— are at the highest risk from radiation damage, because their cells are still rapidly dividing as they are growing.
- A Young adults    B The elderly    C Children    D Adults
37. The ACR has developed a dose registry for individual institutions to review dose trends with a safety committee composed of radiologists, ———, and technologists.
- A residents    B general practitioners    C biologists    D physicists
38. The quantity of absorbed radiation within the body carries a certain amount of risks; therefore, it is the ——— responsibility to monitor all patients dose and utilize radiation protection methods at all times.
- A technologist's    B radiologist's    C clinical supervisor's    D doctor's
39. The ——— is yet another dose descriptor that measures the total exposure the patient receives for the entire scan.
- A multiple-slice average dose    B absorbed dose    C dose length product    D patient dose
40. CT dose index (CTDI) is used to quantitate ——— exposure.
- A public    B patient    C technologists'    D radiologists'
41. Gonadal shielding should be employed when the reproductive organs are within ——— of the x-ray beam, as long as it does not interfere with the area being examined.
- A 6-10 cm    B 10-15 cm    C 4-5 cm    D 15-20 cm
42. Optimal pitch depends on ——— and reconstruction algorithms.
- A breathing frequency    B heart rate    C blood pressure    D pulse oximetry
43. During the retrospective gating method, the ——— continuously acquires data in spiral mode, while the table travels at a constant speed with the data being acquired continuously by all detector rows.
- A scanner    B computer    C monitor    D UPS
44. The most challenging CT examination is:
- A lung imaging    B brain imaging    C hepatic imaging    D cardiac imaging
45. The adverse reactions to contrast agents that occurs in 3% of patients is classified as:
- A moderate    B severe    C intermediate    D mild
46. Which of the following symptoms is not a severe contrast reaction?
- A laryngeal edema    B convulsions    C bronchospasms    D profound hypotension
47. For severe reactions, immediate treatment is necessary and usually requires:
- A observation    B hospitalization    C medication    D reassurance
48. Nosocomial infections are contracted by approximately ——— of patients admitted to hospitals and are the major source of patient mortality and increased cost related to lengthened hospital stays.
- A 10%    B 1%    C 20%    D 40%

49. When administering IV contrast the recommended flow rate for a 24 gauge needle is:  
A 3 mL/sec                      B 1-2 mL/sec                      C <1 mL/sec                      D 4-5 mL/sec

50. ——— is a type of injection in which contrast and air are inserted into a joint.  
A Intra-artrotic                      B Intra-articular                      C Intrathecal                      D Synovial

## CHAPTER TWO: IMAGING PROCEDURES

51. The ——— is the motor and sensory nerve of the face consisting of three major divisions: Ophthalmic, Maxillary and Mandibular.

A Trochlear (IV)                      B Facial (VII)                      C Trigeminal (V)                      D Abducens (VI)

52. Air is conveyed from the nasopharynx to the tympanic cavity through the:

A incus                      B eustachian tube                      C semicircular canals                      D cochlea

53. The ——— control equilibrium and balance.

A semicircular canals                      B cochlea                      C ossicles                      D oval windows

54. The ——— is an endocrine structure that secretes the hormone melatonin.

A adrenal gland                      B thyroid gland                      C pituitary gland                      D pineal gland

55. The ——— is the strongest muscle of the jaw. It arises from the zygomatic arch and inserts on the ramus at the angle of the mandible.

A pterygoid muscle                      B temporalis muscle                      C digastric                      D masseter

56. The sphenoid sinuses are present at birth and continue to grow until the age of:

A 20                      B 12                      C 7                      D 15

57. The ——— is the second largest part of the brain, located in the posterior cranial fossa.

A corpus callosum                      B midbrain                      C cerebellum                      D cerebrum

58. The most delicate meningeal membrane is the:

A pia mater                      B arachnoid mater                      C dura mater                      D epidural space

59. The ——— separates the frontal and parietal lobes of cerebrum.

A fissure of rolando                      B longitudinal fissure                      C sylvian fissure                      D insula

60. Found in the anterior section of the cerebellum, this portion of the brain stem's fibers join the cerebellum to those of the cerebrum and spinal cord:

A the cortex                      B the medulla oblongata                      C the pons                      D the midbrain

61. The external capsule carries the sensory and motor nerve fibers connecting the cerebral cortex to the brainstem and spinal cord:

A True                      B False

62. The ——— is in the diencephalon and is a pair of large oval gray masses. It makes up a large portion of the walls of the third ventricle and is the relay station to and from the cerebral cortex for all sensory stimuli, except the olfactory nerves.

A globus pallidus                      B claustrum                      C putamen                      D thalamus

63. Extra-axial tumors such as meningiomas and schwannomas are not brain tumors, because they do not develop in brain tissue, therefore, they do not have a BBB, so they will also enhance.

A True                      B False

64. The ———, located within the posterior part of the midbrain, transmits CSF from the lateral and third ventricles to the fourth ventricle.

A foramen of Monro                      B choroid plexus                      C cerebral aqueduct                      D medial wall

65. **The arterial system of the brain commences with the:**  
 A vertebral artery                      B pericallosal artery                      C cerebellar artery                      D basilar artery
66. **The ICA bifurcates at the ——— level from the common carotid artery and enters the skull at the carotid canals.**  
 A C5    B C3    C C2    D C4
67. **The ——— is an important landmark on cross-sectional imaging. It can be seen in the posterior region of a middle CT axial slice, since it runs between the corpus callosum and the pineal gland.**  
 A transverse sinus                      B sigmoid sinus                      C vein of Galen                      D straight sinus
68. **When acquiring temporal bone images in a CT, the anatomical coverage begins from the mastoid air cells through the petrous ridges.**  
 A True    B False
69. **Which of the following pathologies is not an indication for Brain angiography?**  
 A subarachnoid hemorrhage    B displaced meniscus                      C aneurysm                                      D vascular abnormality
70. **In cases of acute cerebral infarct, ——— may be performed first.**  
 A venography                                      B brain angiography                      C perfusion series                      D temporomandibular joints
71. **Cholesteatoma is a benign neoplasm of the external auditory canal or middle ear. Patients who acquire this disease range in age from:**  
 A 35 to 44                                      B 45 to 75                                      C 75 to 85                                      D 40 to 55
72. **Acoustic neuroma is a benign tumor of Schwann cells covering vestibule portion of the:**  
 A seventh cranial nerve                      B ninth cranial nerve                      C fifth cranial nerve                      D eighth cranial nerve
73. **Tripod fractures can also be referred to as:**  
 A Le Fort I fractures                      B Orbital fractures                      C Le Fort II fractures                      D Le Fort III fractures
74. **A(n) ——— appears as a classic biconvex (lentiform or football), shaped lesion with the dura bulging inward.**  
 A epidural hematoma                      B aneurysm                                      C subdural hematoma                      D subarachnoid hemorrhage
75. **The pharynx is a funnel-shaped fibromuscular tube ——— long that acts as an opening for both the respiratory and digestive systems.**  
 A 7 cm    B 16 cm    C 12 cm    D 8 cm
76. **——— extends from the soft palate to the tip of the epiglottis.**  
 A The nasopharynx                      B The oropharynx                      C The laryngopharynx                      D The larynx
77. **The trachea is the main airway in the body. It extends from the larynx which terminates into the main bronchi roughly at the ——— vertebral level.**  
 A C4-C5    B C3-C4    C C6-C7    D C7-D1
78. **The hyoid bone is located at the——— vertebral level.**  
 A C4 and C5    B C3 and C4    C C1 and C2    D C2 and C3
79. **The parotid gland is the largest of the salivary glands situated between the rami of the mandible and the ——— muscle:**  
 A sternothyroid                                      B sternocleidomastoid                      C digastric                                      D sternohyoid
80. **The thyroid gland is an endocrine gland located at the level of the:**  
 A cricoid cartilage                                      B arytenoid cartilage                      C corniculate cartilage                      D cuneiform cartilage
81. **Which of the following muscles is not part of the posterior triangle?**  
 A scalene muscle group                      B levator scapulae                      C sternocleidomastoid                      D trapezius

82. The ——— veins are the largest vascular structures of the neck.
- A retromandibular                      B vertebral                      C thyroid                      D jugular
83. Which of the following indications is not an indication to perform neck angiography?
- A vascular abnormalities              B stenosis                      C parotid/submandibular gland lesion or infection              D dissection
84. The carina is seen near the level of the pulmonary arteries at the ——— thoracic vertebra.
- A 3rd                      B 5th                      C 7th                      D 8th
85. The hemiazygos vein ascends along the left side of the vertebral bodies and crosses to right behind the aorta to join the azygos vein at approximately the level of:
- A T7-T9                      B T9-T12                      C T4-T6                      D T5-T7
86. The tricuspid valve contains ——— leaflets and is located at the entrance of the right ventricle preventing blood to backflow into the right atrium.
- A one                      B four                      C three                      D two
87. This supplies the interventricular septum, the AV bundles, and most of the left ventricle and atrium:
- A Right coronary artery              B anterior cardiac arteries              C left marginal artery              D left coronary artery
88. When performing a routine chest CT, the anatomical coverage begins ——— above the clavicles through the adrenal glands.
- A 6 cm                      B 2 cm                      C 4 cm                      D 5 cm
89. What is the indicated study to evaluate pulmonary fibrosis and sarcoidosis?
- A contrasted chest tomography              B chest angiography              C simple chest tomography              D noncontrast high resolution chest tomography
90. Regarding the technical factors in pulmonary embolism, the amount of IV contrast used is:
- A 160 cc                      B 40 cc                      C 100 cc                      D 60 cc
91. Bronchogenic carcinoma is characterized by early lymphogenous and hematogenous spread. On CT images the mass will appear irregular shaped with:
- A spiculated margins              B smooth margins              C lobed margins              D defined margins
92. Pleural effusion can be seen on CT images when the volume of the fluid exceeds:
- A 2 mm                      B 5 mm                      C 30 mm                      D 15 mm
93. The signs and symptoms of pulmonary embolism are chest pain, SOB, hemoptysis and in some cases leg swelling, but more than ——— of patients with PE have no clinical signs.
- A 20%                      B 80%                      C 30%                      D 50%
94. The ——— extends from the liver to the abdominal wall and diaphragm, and divides the liver anatomically into right and left lobes.
- A ligament venosum              B round ligament              C coronary ligament              D falciform ligament
95. The hepatic artery is responsible for ——— of the blood supply to the liver, which accounts for the low attenuation values during the arterial phase of injection.
- A 80-90%                      B 50-60%                      C 15-25%                      D 75-85%
96. The part of the adrenal gland that produces more than two dozen steroids collectively, adrenocortical steroids or just corticosteroids, it is called the:
- A cortex                      B body                      C tail                      D medulla
97. The aorta bifurcates into the right and left common iliac arteries at approximately the level of ——— lumbar vertebra.
- A 1st                      B 4th                      C 3rd                      D 2nd

98. The ——— drains blood from the stomach, duodenum, jejunum, ileum, cecum, appendix, ascending colon, transverse colon, and pancreas.  
A inferior mesenteric vein      B splenic vein      C superior mesenteric vein      D portal vein
99. Routine abdominal studies require the patient to drink oral contrast (———), 30 minutes prior to the start of the examination.  
A 150 mL      B 300 mL      C 100 mL      D 500 mL
100. The ——— refers to the timing that is usually 10 to 20 minutes after an IV injection.  
A nonequilibrium phase      B bolus phase      C delayed phase      D equilibrium phase
101. Which of the following indications is not an indication for kidney CT examination?  
A ureteral lesion      B pyelonephritis      C trauma      D cushing's disease
102. The nephrographic phase is performed ——— seconds from the start of the contrast injection.  
A 100 to 180      B 30 to 80      C 300 to 380      D 400 to 480
103. ——— is the common term for the collection of serous fluid in the peritoneal cavity.  
A Abscess      B Peritonitis      C Hemorrhage      D Ascites
104. Soft tissue sarcomas account for approximately ——— of malignant tumors discovered in adults.  
A 1%      B 10%      C 50%      D 9%
105. The most common cause of renal artery stenosis is:  
A hypotension      B hypertension      C diabetes mellitus      D heart disease
106. This ligament keeps the body of the uterus flexed anteriorly (anteversion), preventing posterior movement of the uterus:  
A broad      B cardinal      C round      D falciform
107. ———% of prostate cancers originate in the peripheral zone.  
A 70 to 80      B 20 to 30      C 10 to 20      D 50 to 60
108. CT colonoscopy is becoming a viable alternative to optical colonoscopy to screen for colorectal cancer. The goal of this technique is to detect polyps greater than ——— in diameter.  
A 1 mm      B 10 mm      C 30 mm      D 20 mm
109. The CT cystogram will demonstrate bladder injury only if completed properly. The procedure involves placing a urinary catheter into the bladder and infusing at least ——— of diluted contrast media for distension of the bladder and accurate diagnosis.  
A 90 cc      B 100 cc      C 200 cc      D 350 cc
110. Approximately ———% of malignant bladder tumors are transitional cell carcinomas.  
A 95%      B 30%      C 15%      D 65%
111. ——— is characterized by submucosal edema with ulcerations involving a thickened segment of distal ileum.  
A Diverticulitis      B Celiac disease      C Crohn's disease      D Colorectal carcinoma
112. The ——— is the only muscle located on the anterior surface of the scapula.  
A infraspinatus muscle      B subscapularis muscle      C teres minor muscle      D supraspinatus muscle
113. The ——— originates in the distal anterior humerus then attaches to the ulna tuberosity and coronoid process.  
A biceps brachii muscle      B triceps muscle      C anconeus muscle      D brachialis muscle
114. The bones of the proximal row of the wrist are scaphoid, lunate, triquetrum and:  
A trapezium      B pisiform      C capitate      D hamate

115. Approximately 96% of all great joint dislocations occur in the:
- A shoulder                      B elbow                      C ankle                      Q wrist
116. The ——— is the largest and most superior bone of the pelvis made up of the body and ala.
- A pubis                      B hip                      C ischium                      D ilium
117. The ——— originates on the inner surface of the sacrum traveling laterally and anteriorly to insert on the superior boundary of the greater trochanter. Its action is to laterally rotate and abduct the thigh.
- A obturator externus muscle    B gluteus maximus muscle    C piriformis muscle            D gluteus medius muscle
118. The ——— is the largest ligament of the knee.
- A lateral collateral ligament    B medial collateral ligament    C posterior cruciate ligament    D patellar ligament
119. Osteosarcoma is rare, but approximately ——— cases are reported annually.
- A 400 to 500                      B 700 to 900                      C 100 to 200                      D 600 to 800
120. The ——— is a strong fibrous cord running over and connecting the tips of the spinous processes from C7 through the sacrum.
- A interspinous ligament        B supraspinous ligament        C transverse ligament            D ligamentum flava
121. The spinal cord resides within the vertebral foramen extending from the foramen magnum to approximately the ——— level, ending as it tapers into the conus medullaris.
- A D11                      B L3                      C L1                      D L5
122. A post myelogram is performed following injection of intrathecal contrast. The patient should be scanned within ——— of injection to sustain the density of contrast in the spinal cord.
- A 4 hours                      B 1 hour                      C 2 hours                      D 5 hours
123. 75% of cases of which type of spondylolisthesis involve vertebral displacement of one vertebra over another inferior to it?
- A Type 2                      B Type 4                      C Type 1                      D Type 3
124. ——— reformatted CT imaging is superior in the demonstration of the shifting of a vertebra over an inferior vertebra in addition to demonstrating the pars interarticularis.
- A Axial                      B Sagittal                      C Longitudinal                      D Coronal
125. A burst fracture is a fracture of the spine in which the ——— is severely compressed.
- A vertebral body                      B spinous apophysis                      C intervertebral disc                      D transverse process
126. The modality of choice for spinal stenosis is ———, since it has a greater sensitivity rate in demonstrating the spinal cord and the soft tissue.
- A CT                      B RX                      C US                      D MRI
127. The splenius muscles are located on the posterior and ——— aspect of the cervical and upper thoracic spine.
- A anterior                      B superior                      C lateral                      D inferior
128. The brachial plexus runs between the anterior and middle scalene muscle, from:
- A C5 to T1                      B C1 to C4                      C C2 to C3                      D T2 to T3

### CHAPTER THREE: PHYSICS AND INSTRUMENTATION

129. The photons' energy decreases by transferring their energy to ——— in matter.
- A protons                      B electrons                      C ions                      D neutrons
130. ——— occurs when an incident x-ray photon interacts with an electron in the atom's outer shell resulting in ionization of the target atom.
- A Magnetization                      B Compton scatter                      C Photoelectric interaction                      D Scattered radiation

131. Data acquisition refers to a technique by which the patient is systematically scanned by the x-ray tube and ——— to collect enough information to produce a computed tomography (CT) image path.
- A console                                      B amplifier                                      C transmitter                                      D detectors
132. The ——— employed the rotate-rotate scanning geometry principle with the fan beam geometry. This principle allowed the x-ray tube and detectors to make a complete 360-degree rotation around the patient in order to collect a large set of data samples for the reconstruction.
- A fourth generation CT                      B first generation CT                      C third generation CT                      D second generation CT
133. Fourth generation scan times are:
- A 1 to 5 seconds                      B 5 to 10 seconds                      C 10 to 15 seconds                      D 5 minutes
134. The fifth generation scanners are known as dual source CT scanners.
- A True                                      B False
135. Attenuation is the reduction of the intensity of a beam of radiation as it passes through an object.
- A True                                      B False
136. What does the value “e” stand for in the attenuation equation  $I = I_0 e^{-\mu x}$ ?
- A original intensity                      B attenuation coefficient                      C thickness of the object                      D natural logarithm
137. The x-ray tubes now are encased in a metal envelope instead of the glass envelope, which solves the problem of electrical arcing resulting from ——— deposits caused by vaporization.
- A boron                                      B cobalt                                      C tungsten                                      D carbon
138. The spiral/helical scanners employ a ——— diameter rotating anode disk allowing for the use of higher tube currents in the range of 120 to 140 kVp.
- A 20 mm                                      B 200 mm                                      C 120 mm                                      D 400 mm
139. The cathode construction consists of ——— filaments, each of a different length, and placed in a focusing cup.
- A two or three                                      B three or four                                      C one or two                                      D two or four
140. The dual filaments sizes are ——— in CT scanners.
- A 0.5 mm and 1.2 mm                      B 1.5 mm and 2.2 mm                      C 2.5 mm and 3 mm                      D 3 mm and 3.5 mm
141. Regarding scanning parameters, ——— determines the energy level of x-ray photons produced.
- A tube window                                      B tube voltage                                      C warm up procedure                                      D tube current
142. Modern CT scanners use high-frequency generators because they are small, compact, and more efficient than conventional generators. Once high-voltage rectification and smoothing are performed, the voltage ripple is less than ———, making these generators more efficient at x-ray production.
- A 10%                                      B 15%                                      C 5%                                      D 1%
143. Current CT generators can have a maximum power rating of about ———, allowing kVp settings in the range of 80 to 140 and tube currents in the range of 100 to 400 mA depending on the vendor.
- A 50 kilowatts                                      B 150 kilowatts                                      C 20 kilowatts                                      D 70 kilowatts
144. ——— convert x-ray energy into light, and then the light is converted into electrical energy by means of crystal plates coupled to a solid-state photodiode semiconductor.
- A Crystal detectors                                      B Scintillation detectors                                      C Gas ionization detectors                                      D Metal detectors
145. The gas employed in gas ionization detectors was ——— due to its relative lightness.
- A neon                                      B argon                                      C radon                                      D xenon
146. The dual-slice spiral CT scanner was introduced in ——— by Elscint.
- A 2001                                      B 1995                                      C 1991                                      D 2006

147. In a(n) ———, detector width gradually increases in thickness as it moves away from the center of axis rotation.
- A adaptive, variable, or nonuniform array      B hybrid element array      C matrix or uniform array      D multi-dimensional array
148. The purpose of collimation is to protect ——— by restricting the beam to the anatomy of interest.
- A the doctor      B the patient      C the technician      D anyone in the room
149. The ——— defines the maximum permissible beam and ensures proper alignment of the beam to hit the detector aperture.
- A prepatient collimation      B adjustable collimator      C collimator      D fixed collimator
150. The important characteristics of the CT computer system are its large storage capacity and slow and efficient processing of various kinds of data.
- A True      B False
151. In ———, information is processed on one computer containing two or more CPUs.
- A pipeline processing      B distributed processing      C parallel processing      D archive processing
152. ——— is a type of reconstruction method, known as the convolution method, developed in order to eliminate the star pattern typical of the back projection method.
- A Iterative reconstruction      B Back projection      C Reconstruction      D Filtered back projection
153. One of the advantages of modeled based iterative reconstruction models is the use of a low-dose protocol which notes a dose reduction of approximately ——— with improved low-contrast detectability.
- A 50 to 75%      B 75 to 90%      C 10 to 45%      D 35 to 65%
154. The two types of z-interpolation used are ——— degree linear interpolation.
- A 200- and 160-      B 180- and 90-      C 360- and 180-      D 90- and 45-
155. ——— are unprocessed computer data in the form of binary numbers.
- A Bits      B Raw data      C Bytes      D Numeric codes
156. ——— is the image reconstructed that occurs from the request of the technologist using raw data.
- A Reconstruction interval      B Prospective reconstruction      C Reconstruction      D Retrospective reconstruction
157. The post-processing techniques employed in CT are MPR, 3D techniques and:
- A virtual reality techniques      B sagittal reconstruction      C coronal reconstruction      D MIP
158. In multi-planar reformation, each pixel in the ——— matrix when used in conjunction with the slice thickness forms a voxel or volume of data representing the digital values of the scanned object.
- A  $250^2$       B  $512^2$       C  $412^2$       D  $350^2$
159. The clinical application of MIP is mainly used in CT:
- A urography      B of the brain      C angiography      D of the abdomen
160. MinP is extremely limited in the detection of ——— associated changes.
- A intrahepatic bile ducts      B parenchymal density      C central tracheobronchial system      D tumor
161. The three tissue types used for voxel classification are fat, soft tissue, and:
- A epithelial      B bone      C lung      D encephalon
162. A left ventricle ejection fraction of ——— percent or higher is considered normal.
- A 55      B 15      C 25      D 30

163. The fundamental parameters of a digital image include matrix, pixels, voxels, and:
- A spatial resolution                      B photon                      C FOV                      D bit depth
164. ——— is a computer software program integrated into the CT system that allows the user to zoom an image on a computer monitor.
- A Voxel                      B Image magnification                      C Scan                      D Matrix
165. The human eye can process approximately ——— shades of gray; therefore, a process known as windowing is applied to visualize objects in the reconstructed image.
- A 10 to 30                      B 30 to 40                      C 40 to 60                      D 65 to 70
166. Images of the lung and bone require window widths from ——— shades of gray to accentuate the air spaces and bronchioles in the lungs and delineation between cortical bone, trabecular bone and bone marrow.
- A 500 to 800                      B 300 to 500                      C 300 to 1000                      D 1000 to 2000
167. The lung parenchyma is viewed with a window level from -500 to -800, since air has an attenuation value of:
- A -1000                      B -500                      C -100                      D -10
168. A(n) ——— is a quantitative analytic measurement tool found on most CT scanners and PACS workstations.
- A FOV                      B ROI                      C Cine mode                      D UH
169. The laser beam diameter is often in the order of ——— providing a broad gray-scale and excellent spatial resolution.
- A 1.5 mm                      B 2 mm                      C 0.6 mm                      D 0.1 mm
170. In ———, The ACR-NEMA committee was formed to explore ways of standardizing the interconnection of imaging devices and establishing a reasonable common ground for users and vendors.
- A 2005                      B 1975                      C 1985                      D 1995
171. The storage capacity of a tape reel for archiving ranged from ——— characters.
- A 900 to 1500                      B 1600 to 6400                      C 500 to 1000                      D 7000 to 9000
172. Magnetic or floppy disks are composed of concentric tracks with ——— per track allowing information to be written on these tracks where space is available.
- A 10 sectors                      B 7 sectors                      C 15 sectors                      D 17 sectors
173. The universal format for PACS image storage and transfer is:
- A LAN                      B bitmap                      C DICOM                      D cloud
174. ——— only transmits data in one direction and uses a common channel to connect all devices.
- A Bus topology                      B Ring topology                      C Monolateral topology                      D Star topology
175. A ——— supplies networking capabilities to a group of computers in close proximity to each other as in an office building or home.
- A WAN                      B LAN                      C RAM                      D MAN
176. There is/are ——— method(s) quantifying spatial resolution.
- A two                      B one                      C three                      D four
177. The ability to resolve ——— produces the best spatial resolution.
- A 10 lp/cm                      B 50 lp/cm                      C 40 lp/cm                      D 21 lp/cm
178. The indirect measurement of spatial resolution is performed using a phantom with a ——— diameter tungsten wire submerged in water.
- A 1.5 mm                      B 0.5 mm                      C 0.08 mm                      D 0.03 mm
179. The pixel size as stated earlier is determined by the matrix size and the:
- A CT number                      B noise                      C resolution                      D FOV

180. Thin slice thicknesses are best used when looking for small details within the scanned object as in the case of HRCT images of the chest looking for ——— or musculoskeletal imaging to determine fine fractures or loose bodies.

- A granulomas                      B abscesses                      C masses                      D pleural effusion

181. CT has the capability to image tissues that vary only slightly in density and atomic number, thus detecting density difference from:

- A 0.5 to 1.5%                      B 0.25 to 0.5%                      C 1.5 to 2%                      D 0.15 to 0.3%

182. Noise plays an important role in LCD and can be defined as the undesirable fluctuation of ——— values in an image of a homogeneous material.

- A contrast                      B matrix                      C pixel                      D voxel

183. Since CT utilizes high kVp in the range of ———, kVp incurs a slight effect on noise.

- A 100 to 140                      B 50 to 100                      C 200 to 300                      D 300 to 340

184. ——— is represented by the volume of tissue within the voxel.

- A Photon flux                      B Slice thickness                      C Focal spot size                      D Sampling theorem

185. Detectors must be capable of discriminating among small differences in x-ray attenuation required to measure small differences in soft tissue contrast, in the order of at least:

- A 10%                      B 5%                      C 8%                      D 1%

186. ——— refers to the precision of a measurement with respect to time.

- A Reconstruction algorithms                      B Detector sensitivity                      C Temporal resolution                      D Image display

187. The noise test requires the use of a ——— water phantom.

- A 10 cm                      B 30 cm                      C 40 cm                      D 20 cm

188. ——— refers to the relationship of the CT number of the reconstructed object to the measured linear attenuation coefficient.

- A Linearity                      B High contrast                      C Contrast resolution                      D Spatial resolution

189. The three main sources of CT artifacts are physics-based, patient-based and:

- A operator-based                      B computer-based                      C scanner-based                      D doctor-based

190. ——— is/are inconsistencies of the projected data on the reconstructed image due to the high density of the metal.

- A Edge gradient artifacts                      B Aliasing                      C Motion                      D Metallic artifacts

191. The cause of the ring artifact is:

- A a metallic object                      B single slice scanner solid-state detectors                      C movement                      D computer damage

192. An artifact that arises due to the beam geometry representing a cone rather than fan angle is a(n):

- A cone beam artifact                      B tube arcing artifact                      C out of field artifact                      D movement artifact

Fill in each blank. There are two options to submit the post-test.

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