

PRACTICE EXAM 7: ARRT COMPUTED TOMOGRAPHY SIMULATION (165 QUESTIONS)

This practice exam contains 165 scored-style questions aligned to the ARRT Computed Tomography content specifications effective September 1, 2026. Select the single best answer for each question. The official examination also includes 30 unscored pilot questions. A scaled score of 75 is generally required to pass; scaled scores are not raw percentages.

1. Before iodinated contrast, which laboratory result most directly estimates renal filtration?
 - A. Platelet count
 - B. Hemoglobin
 - C. eGFR
 - D. Serum sodium

2. A patient develops localized hives after contrast but has no dyspnea or hypotension. How is this reaction classified?
 - A. Moderate physiologic reaction
 - B. Mild allergic-like reaction
 - C. Severe allergic-like reaction
 - D. Cardiopulmonary arrest

3. Which action is part of a proper preprocedure time-out?
 - A. Confirm the patient, procedure, and site
 - B. Select the reconstruction kernel
 - C. Archive the prior examination
 - D. Warm the x-ray tube

4. Which IV site is generally preferred for a high-rate power injection when suitable access is available?

- A. A small dorsal hand vein
- B. A lower-extremity vein
- C. A large antecubital vein
- D. A fragile superficial wrist vein

5. What is the first action when contrast extravasation is suspected during injection?

- A. Increase the injection pressure
- B. Continue scanning without assessment
- C. Flush rapidly with more contrast
- D. Stop the injection immediately

6. Which symptom after iodinated contrast requires the most urgent response?

- A. Transient metallic taste
- B. Brief warmth at injection
- C. Stridor with respiratory distress
- D. Mild localized itching

7. When transferring a patient with limited mobility, what approach best reduces injury risk?

- A. Pull the patient by both arms
- B. Use an appropriate transfer device and adequate staff
- C. Ask the patient to move without assistance
- D. Twist while lifting from the waist

8. Why should oxygen tubing and chest tubes be checked before moving a patient onto the CT table?

- A. To prevent disconnection, tension, or loss of function
- B. To increase image contrast
- C. To reduce x-ray tube heat
- D. To calibrate detector response

9. Which practice best supports aseptic venipuncture?

- A. Touch the cleaned site repeatedly
- B. Reuse a single-use tourniquet
- C. Place supplies on the scanner table
- D. Disinfect the site and avoid repalpating it afterward

10. A competent adult asks to stop the CT examination. What should the technologist do?

- A. Stop and address the patient's refusal
- B. Continue because consent was signed
- C. Restrain the patient to finish
- D. Ask a family member to override refusal

11. Which documentation is most important after a power injection?

- A. Only the scanner model
- B. Only the room number
- C. Only the patient's arrival time
- D. Site, catheter, contrast amount, concentration, and flow rate

12. During protocol review, before iodinated contrast, which laboratory result most directly estimates renal filtration?

- A. Platelet count
- B. eGFR
- C. Hemoglobin
- D. Serum sodium

13. During protocol review, a patient develops localized hives after contrast but has no dyspnea or hypotension. How is this reaction classified?

- A. Moderate physiologic reaction
- B. Severe allergic-like reaction
- C. Mild allergic-like reaction
- D. Cardiopulmonary arrest

14. During protocol review, which action is part of a proper preprocedure time-out?

- A. Confirm the patient, procedure, and site
- B. Select the reconstruction kernel
- C. Archive the prior examination
- D. Warm the x-ray tube

15. During protocol review, which IV site is generally preferred for a high-rate power injection when suitable access is available?

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- A. Stop and address the patient's refusal
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22. Which interaction is the principal source of scattered radiation in diagnostic CT?

- A. Pair production
- B. Photodisintegration
- C. Coherent absorption
- D. Compton scattering

23. A CT protocol has CTDI_{vol} 12 mGy and scan length 40 cm. What is the DLP?

- A. 240 mGy-cm
- B. 360 mGy-cm
- C. 480 mGy-cm
- D. 600 mGy-cm

24. Which parameter most directly describes total scan dose output across scan length?

- A. Dose-length product
- B. Window width
- C. Display field of view

D. Reconstruction interval

25. What is the usual effect of increasing helical pitch while other factors remain fixed?

- A. Higher dose from overlap
- B. Lower radiation dose
- C. Narrower display field
- D. Greater iodine concentration

26. Which strategy is most appropriate for pediatric CT dose optimization?

- A. Use the adult protocol unchanged
- B. Increase scan length for reassurance
- C. Repeat every motion-degraded series
- D. Tailor technique to patient size and clinical task

27. What does CTDIvol primarily represent?

- A. Standardized scanner radiation output for a protocol
- B. Exact individual effective dose
- C. Image matrix dimensions
- D. Contrast injection pressure

28. Why should the patient be centered at gantry isocenter?

- A. To eliminate all scatter
- B. To change iodine osmolality
- C. To support proper dose modulation and image quality
- D. To increase network speed

29. Exposure rate is 80 units at 1 meter from a point source. What is it at 2 meters?

- A. 40 units
- B. 20 units
- C. 80 units
- D. 160 units

30. What is overranging in helical CT?

- A. Displaying anatomy beyond the DFOV
- B. Sending images twice to PACS
- C. Irradiation beyond planned image boundaries for interpolation
- D. Injecting contrast after scanning

31. Which unit is used for absorbed radiation dose?

- A. Sievert
- B. Becquerel
- C. Coulomb per kilogram only
- D. Gray

32. Which action best limits staff exposure during a routine CT acquisition?

- A. Stand beside the gantry opening
- B. Remain behind the protective control barrier
- C. Hold the patient without protection
- D. Increase scan time

33. During protocol review, which interaction is the principal source of scattered radiation in diagnostic CT?

- A. Compton scattering
- B. Pair production
- C. Photodisintegration
- D. Coherent absorption

34. During protocol review, if distance from a point radiation source doubles, exposure rate becomes approximately what fraction?

- A. One half
- B. Twice
- C. One fourth
- D. Four times

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- B. Display field of view
- C. Reconstruction interval
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- D. To increase network speed

40. During protocol review, which change commonly reduces image noise but may increase radiation dose?

- A. Reducing photon number
- B. Increasing mAs
- C. Increasing reconstruction thickness only
- D. Narrowing display window only

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43. What function does the data acquisition system perform?

- A. Injects contrast medium
- B. Positions the patient's arms
- C. Archives signed consent
- D. Converts detector signals into digital data

44. What enables continuous gantry rotation in helical CT?

- A. A stationary anode
- B. Slip-ring technology
- C. Film-screen cassettes
- D. Mechanical table locks

45. Which reconstruction method reduces noise through repeated model-based estimates?

- A. Iterative reconstruction
- B. Simple magnification
- C. Window leveling

D. Prospective gating

46. What happens when display field of view decreases while matrix size stays constant?

- A. Pixel size increases
- B. Slice thickness doubles
- C. Pixel size decreases
- D. Pitch becomes zero

47. A 40 cm display field uses a 512 matrix. What is the approximate pixel dimension?

- A. 0.078125 cm
- B. 0.0390625 cm
- C. 0.15625 cm
- D. 0.8 cm

48. Ring artifacts most often indicate what problem?

- A. Patient swallowing only
- B. A miscalibrated or defective detector element
- C. Incorrect contrast timing
- D. Excessive table padding

49. Which artifact commonly appears between dense bones in the posterior fossa?

- A. Aliasing from low matrix only
- B. Chemical shift
- C. Radiofrequency zipper artifact
- D. Beam-hardening streaks

50. What is partial-volume averaging?

- A. Different tissues combined within one voxel
- B. Two studies merged in PACS
- C. A detector measured twice
- D. Contrast split between syringes

51. Which postprocessing technique highlights high-attenuation structures along a viewing ray?

- A. Minimum intensity projection
- B. Simple axial averaging
- C. Maximum intensity projection
- D. Surface coil correction

52. Which postprocessing technique is particularly useful for airways?

- A. Maximum intensity projection
- B. Calcium scoring only
- C. Edge padding
- D. Minimum intensity projection

53. What does a sharper reconstruction kernel usually improve?

- A. Low-contrast resolution
- B. Spatial resolution
- C. Contrast injection rate
- D. Patient renal function

54. What is the main advantage of overlapping reconstruction intervals?

- A. Improved quality of MPR and 3D reformations
- B. Elimination of radiation exposure
- C. Reduced contrast volume automatically
- D. Larger physical detector elements

55. Which factor most improves temporal resolution in cardiac CT?

- A. Wider display window
- B. Larger DFOV
- C. Shorter effective acquisition time
- D. Thicker table padding

56. What is raw CT data?

- A. Only exported JPEG images
- B. The signed radiology report
- C. The patient scheduling record
- D. Unreconstructed projection measurements

57. Which network standard supports medical image formatting and exchange?

- A. HTML only
- B. USB voltage
- C. DICOM
- D. HL7 room lighting

58. A helical scan uses table travel of 48 mm per rotation and total beam width of 32 mm. What is pitch?

- A. 0.67
- B. 1.5
- C. 1

D. 2

59. Which acquisition uses table movement during continuous gantry rotation?

- A. Helical acquisition
- B. Sequential step-and-shoot only
- C. Static radiography
- D. Ultrasound cine capture

60. What is a principal benefit of dual-energy CT?

- A. Eliminating all image noise
- B. Removing the need for detectors
- C. Preventing every motion artifact
- D. Material differentiation using energy-dependent attenuation

61. What does increasing slice thickness generally do to image noise?

- A. Increases noise
- B. Decreases noise
- C. Has no possible effect
- D. Changes patient identity

62. Which quality-control test evaluates CT-number consistency across uniform material?

- A. Table speed test only
- B. Speaker volume test
- C. Injector battery test
- D. Uniformity test

63. Water should measure approximately what CT number on a calibrated system?

- A. -1000 HU
- B. +1000 HU
- C. 0 HU
- D. +3000 HU

64. A reconstruction covers 300 mm with 1.5 mm spacing. Approximately how many image positions are produced?

- A. 200 images
- B. 150 images
- C. 300 images
- D. 450 images

65. What is cone-beam artifact most associated with?

- A. Incorrect patient name
- B. Wide detector arrays and imperfect z-axis reconstruction
- C. Low contrast osmolality
- D. Missing consent form

66. Why is tube warm-up performed after extended inactivity?

- A. To reduce thermal stress on the anode
- B. To increase patient heart rate
- C. To disinfect the gantry
- D. To compress image files

67. Which parameter defines anatomy included during acquisition?

- A. Display field of view only
- B. Window level
- C. Scan field of view
- D. Archive compression ratio

68. What is the effect of reducing reconstruction interval below slice thickness?

- A. Creates gaps between images
- B. Creates overlapping images
- C. Stops table motion
- D. Reduces tube voltage

69. During protocol review, what function does the data acquisition system perform?

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- A. Pixel size increases
- B. Slice thickness doubles
- C. Pitch becomes zero
- D. Pixel size decreases

73. An image has window level 50 HU and width 400 HU. What is the lower window boundary?

- A. -150 HU
- B. -350 HU
- C. 150 HU
- D. 250 HU

74. During protocol review, ring artifacts most often indicate what problem?

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- C. A miscalibrated or defective detector element
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- A. HTML only
- B. USB voltage
- C. HL7 room lighting
- D. DICOM

84. During protocol review, what does PACS primarily provide?

- A. Automatic venipuncture
- B. X-ray generation
- C. Storage, retrieval, and distribution of images
- D. Radiopharmaceutical production

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- A. Increases noise
- B. Has no possible effect
- C. Decreases noise
- D. Changes patient identity

88. A 20 cm scan is reconstructed every 2 mm. Approximately how many image positions result?

- A. 10 images
- B. 40 images
- C. 200 images
- D. 100 images

89. During protocol review, water should measure approximately what CT number on a calibrated system?

- A. 0 HU
- B. -1000 HU
- C. +1000 HU
- D. +3000 HU

90. During protocol review, how does increasing matrix size at constant DFOV affect pixel size?

- A. It decreases pixel size
- B. It increases pixel size
- C. It increases pitch
- D. It eliminates scatter

91. During protocol review, what is cone-beam artifact most associated with?

- A. Incorrect patient name
- B. Low contrast osmolality
- C. Wide detector arrays and imperfect z-axis reconstruction
- D. Missing consent form

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- A. To increase patient heart rate
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- C. To compress image files
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- A. Display field of view only
- B. Scan field of view
- C. Window level
- D. Archive compression ratio

94. During protocol review, what is the effect of reducing reconstruction interval below slice thickness?

- A. Creates gaps between images
- B. Stops table motion
- C. Creates overlapping images
- D. Reduces tube voltage

95. For a routine noncontrast head CT, which plane is commonly used for primary axial review?

- A. Axial plane
- B. Coronal plane only
- C. Sagittal plane only
- D. Oblique cardiac plane

96. Which finding is typically hyperattenuating on an acute noncontrast head CT?

- A. Simple cerebrospinal fluid
- B. Acute intracranial hemorrhage
- C. Intracranial air
- D. Chronic encephalomalacia

97. For temporal bone CT, which reconstruction is most important for fine osseous detail?

- A. Thick sections with a smooth kernel
- B. Wide sections without reformations
- C. Low-resolution soft-tissue images only
- D. Thin sections with a sharp bone kernel

98. Which structure is evaluated directly on a CT examination of the orbits?

- A. Optic nerve
- B. Common bile duct
- C. Adrenal cortex
- D. Femoral condyle

99. In suspected cervical spine trauma, what reconstruction improves assessment of alignment?

- A. Coronal lung MIP
- B. Sagittal MPR
- C. Cardiac calcium score
- D. Virtual colonoscopy fly-through

100. Which phase best demonstrates renal collecting-system opacification during CT urography?

- A. Early arterial phase
- B. Unenhanced localizer only
- C. Immediate pulmonary phase
- D. Excretory delayed phase

101. Contrast volume is 90 mL and injection rate is 3 mL/s. How long does injection last?

- A. 27 seconds
- B. 45 seconds
- C. 30 seconds
- D. 90 seconds

102. Which breathing instruction generally minimizes motion during chest CT?

- A. Pant rapidly throughout
- B. Hold one full inspiration
- C. Speak continuously
- D. Perform repeated swallowing

103. Which protocol feature is central to high-resolution CT of the lungs?

- A. Thick sections with heavy smoothing
- B. Only postcontrast delayed images
- C. A small head scan field
- D. Thin sections with a high-spatial-frequency kernel

104. Which cardiac CT method acquires data only during selected cardiac phases to reduce dose?

- A. Prospective ECG triggering
- B. Continuous ungated helical scanning
- C. Delayed renal imaging
- D. Retrograde cystography

105. For coronary calcium scoring, is intravenous iodinated contrast routinely required?

- A. Yes, for every patient
- B. Only barium is required
- C. No, the study is typically noncontrast

D. Intrathecal contrast is required

106. Which vessel is the usual enhancement target for abdominal aortic CTA?

- A. Portal vein only
- B. Inferior vena cava only
- C. Abdominal aorta
- D. Renal collecting system

107. Which phase best evaluates hypervascular liver lesions?

- A. Unenhanced phase only
- B. Very delayed bladder phase
- C. Noncontrast lung window only
- D. Late arterial phase

108. Which phase is commonly most useful for routine abdominal organ enhancement?

- A. Portal venous phase
- B. Immediate precontrast scout
- C. Pulmonary arterial phase
- D. Very early coronary phase

109. For suspected urinary stone disease, which initial CT technique is commonly used?

- A. Routine oral barium with long delay
- B. Noncontrast thin-section CT
- C. Cardiac-gated contrast CT
- D. Intrathecal contrast CT

110. Which preparation is important for CT colonography?

- A. No bowel preparation or distention
- B. Colon cleansing and gas distention
- C. Intrathecal contrast injection
- D. ECG electrode removal only

111. For CT-guided biopsy, what confirms the intended needle path before sampling?

- A. A routine chest radiograph only
- B. PACS logout
- C. Intermittent localization imaging
- D. Window width alone

112. Which structure lies in the posterior mediastinum?

- A. Descending thoracic aorta
- B. Thyroid gland
- C. Gallbladder
- D. Urinary bladder

113. Which vessel carries oxygenated blood from the lungs to the left atrium?

- A. Pulmonary arteries
- B. Superior vena cava
- C. Inferior vena cava
- D. Pulmonary veins

114. Which organ is located primarily in the left upper abdominal quadrant?

- A. Appendix
- B. Gallbladder
- C. Cecum
- D. Spleen

115. Which adrenal gland is commonly described as more triangular?

- A. Left adrenal gland
- B. Right adrenal gland
- C. Pituitary gland
- D. Thymus

116. Which vessel is formed by union of the superior mesenteric and splenic veins?

- A. Portal vein
- B. Hepatic artery
- C. Inferior vena cava
- D. Renal artery

117. Which pancreatic part lies within the duodenal curve?

- A. Tail
- B. Body
- C. Head
- D. Uncinate-free fundus

118. Which structure is anterior to the sacrum in the midline pelvis?

- A. Trachea
- B. Aortic arch
- C. Sphenoid sinus

D. Rectum

119. For suspected appendicitis, which structure should be traced from the cecum?

- A. Vermiform appendix
- B. Common hepatic duct
- C. Pancreatic tail
- D. Left ureter only

120. Which contrast route directly opacifies the bladder for CT cystography?

- A. Oral administration
- B. Intrathecal injection
- C. Retrograde instillation through a urinary catheter
- D. Intra-articular injection

121. Which postprocessing display is useful for vascular overview in CTA?

- A. Minimum intensity projection only
- B. Maximum intensity projection
- C. Unenhanced scout only
- D. Audio waveform display

122. What is the preferred patient position for most routine chest and abdominal CT examinations?

- A. Prone for every patient
- B. Supine
- C. Standing in the gantry
- D. Trendelenburg for all scans

123. Why are the arms usually raised for chest or abdominal CT when possible?

- A. To increase renal filtration
- B. To lower contrast osmolality
- C. To reduce beam-hardening artifact through the torso
- D. To change cardiac rhythm

124. Which finding may indicate a tension pneumothorax on CT?

- A. Pleural air with mediastinal shift
- B. Small stable pleural effusion only
- C. Calcified granuloma
- D. Symmetric lung expansion

125. Which structure passes through the foramen magnum?

- A. Optic nerve
- B. Facial nerve in IAC
- C. Internal carotid in carotid canal only
- D. Medulla transitioning to spinal cord

126. Which sinus lies within the sphenoid bone?

- A. Frontal sinus
- B. Maxillary sinus
- C. Sphenoid sinus
- D. Mastoid air cells

127. Which plane best demonstrates bilateral sacroiliac joints together?

- A. Coronal plane
- B. Axial plane only
- C. Cardiac short axis
- D. Oblique lung MIP

128. Which reconstruction is useful for subtle extremity fractures?

- A. Thick smooth images only
- B. Lung minIP only
- C. Delayed renal images
- D. Thin-section bone algorithm with multiplanar reformations

129. Which vessel should be opacified for lower-extremity arterial runoff CTA?

- A. Portal venous system only
- B. Arterial system from aorta through pedal vessels
- C. Superior sagittal sinus
- D. Pulmonary veins only

130. What is a key concern during CT-guided lung biopsy?

- A. Cataract formation during one scan
- B. Pneumothorax
- C. Gallstone migration
- D. Otitis media

131. During protocol review, for a routine noncontrast head CT, which plane is commonly used for primary axial review?

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- B. Coronal plane only

- C. Sagittal plane only
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137. During protocol review, for suspected pulmonary embolism, contrast timing targets which vessel?

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- B. Portal vein
- C. Renal pelvis
- D. Superior sagittal sinus

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- B. Unenhanced phase only
- C. Very delayed bladder phase
- D. Noncontrast lung window only

144. During protocol review, which phase is commonly most useful for routine abdominal organ enhancement?

- A. Immediate precontrast scout
- B. Pulmonary arterial phase
- C. Very early coronary phase
- D. Portal venous phase

145. During protocol review, for suspected urinary stone disease, which initial CT technique is commonly used?

- A. Routine oral barium with long delay
- B. Cardiac-gated contrast CT
- C. Noncontrast thin-section CT
- D. Intrathecal contrast CT

146. During protocol review, which preparation is important for CT colonography?

- A. Colon cleansing and gas distention
- B. No bowel preparation or distention
- C. Intrathecal contrast injection
- D. ECG electrode removal only

147. During protocol review, for CT-guided biopsy, what confirms the intended needle path before sampling?

- A. A routine chest radiograph only
- B. PACS logout
- C. Intermittent localization imaging
- D. Window width alone

148. During protocol review, which structure lies in the posterior mediastinum?

- A. Thyroid gland
- B. Gallbladder
- C. Urinary bladder
- D. Descending thoracic aorta

149. During protocol review, which vessel carries oxygenated blood from the lungs to the left atrium?

- A. Pulmonary arteries
- B. Pulmonary veins
- C. Superior vena cava
- D. Inferior vena cava

150. During protocol review, which organ is located primarily in the left upper abdominal quadrant?

- A. Appendix
- B. Gallbladder
- C. Cecum
- D. Spleen

151. During protocol review, which adrenal gland is commonly described as more triangular?

- A. Left adrenal gland
- B. Right adrenal gland
- C. Pituitary gland
- D. Thymus

152. During protocol review, which vessel is formed by union of the superior mesenteric and splenic veins?

- A. Hepatic artery
- B. Inferior vena cava
- C. Portal vein
- D. Renal artery

153. During protocol review, which pancreatic part lies within the duodenal curve?

- A. Head
- B. Tail
- C. Body
- D. Uncinate-free fundus

154. During protocol review, which structure is anterior to the sacrum in the midline pelvis?

- A. Trachea
- B. Rectum
- C. Aortic arch
- D. Sphenoid sinus

155. During protocol review, for suspected appendicitis, which structure should be traced from the cecum?

- A. Common hepatic duct
- B. Pancreatic tail
- C. Vermiform appendix
- D. Left ureter only

156. During protocol review, which contrast route directly opacifies the bladder for CT cystography?

- A. Retrograde instillation through a urinary catheter
- B. Oral administration
- C. Intrathecal injection
- D. Intra-articular injection

157. During protocol review, which postprocessing display is useful for vascular overview in CTA?

- A. Minimum intensity projection only
- B. Unenhanced scout only
- C. Audio waveform display
- D. Maximum intensity projection

158. During protocol review, what is the preferred patient position for most routine chest and abdominal CT examinations?

- A. Supine
- B. Prone for every patient
- C. Standing in the gantry
- D. Trendelenburg for all scans

159. During protocol review, why are the arms usually raised for chest or abdominal CT when possible?

- A. To increase renal filtration
- B. To lower contrast osmolality
- C. To change cardiac rhythm
- D. To reduce beam-hardening artifact through the torso

160. During protocol review, which finding may indicate a tension pneumothorax on CT?

- A. Small stable pleural effusion only
- B. Pleural air with mediastinal shift

- C. Calcified granuloma
- D. Symmetric lung expansion

161. During protocol review, which structure passes through the foramen magnum?

- A. Optic nerve
- B. Facial nerve in IAC
- C. Medulla transitioning to spinal cord
- D. Internal carotid in carotid canal only

162. During protocol review, which sinus lies within the sphenoid bone?

- A. Frontal sinus
- B. Maxillary sinus
- C. Sphenoid sinus
- D. Mastoid air cells

163. During protocol review, which plane best demonstrates bilateral sacroiliac joints together?

- A. Coronal plane
- B. Axial plane only
- C. Cardiac short axis
- D. Oblique lung MIP

164. During protocol review, which reconstruction is useful for subtle extremity fractures?

- A. Thick smooth images only
- B. Lung minIP only
- C. Delayed renal images
- D. Thin-section bone algorithm with multiplanar reformations

165. During protocol review, which vessel should be opacified for lower-extremity arterial runoff CTA?

- A. Portal venous system only
- B. Arterial system from aorta through pedal vessels
- C. Superior sagittal sinus
- D. Pulmonary veins only

Practice Exam 7: Answer Key and Explanations

1. C — eGFR estimates kidney filtration and helps the clinical team assess renal risk before iodinated contrast. The other values may matter clinically, but they do not directly quantify filtration. The correct choice is eGFR. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Clear assessment and documentation support safe, reproducible care.

2. B — Limited urticaria without airway or circulatory compromise is a mild allergic-like reaction. Progression, respiratory symptoms, or hypotension would raise the severity category and require more urgent intervention. The correct choice is Mild allergic-like reaction. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Clear assessment and documentation support safe, reproducible care.

3. A — A time-out verifies the correct patient and intended procedure before scanning. Technical setup and archiving tasks are important, but they do not replace this safety confirmation. The correct choice is Confirm the patient, procedure, and site. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective.

4. C — A large antecubital vein usually tolerates high flow more reliably than smaller distal vessels. Catheter condition, gauge, institutional policy, and patient factors must still be assessed. The correct choice is A large antecubital vein. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Clear assessment and documentation support safe, reproducible care.

5. D — Stopping the injection limits additional contrast from entering soft tissue. The site and patient are then assessed and managed according to local policy, with documentation and escalation when needed. The correct choice is Stop the injection immediately. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective.

6. C — Stridor suggests critical upper-airway compromise and requires immediate emergency response. Warmth, taste, and limited itching are usually less severe, though every patient must be observed for progression. The correct choice is Stridor with respiratory distress. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective.

- 7. B** — Transfer aids and enough trained staff protect both patient and workers while maintaining alignment. Pulling, twisting, or expecting unsupported movement increases the risk of falls and musculoskeletal injury. The correct choice is Use an appropriate transfer device and adequate staff. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective.
- 8. A** — Accessory devices can kink, disconnect, or become displaced during transfer. Securing and monitoring them preserves therapy and patient safety; it does not alter detector calibration or x-ray production. The correct choice is To prevent disconnection, tension, or loss of function. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective.
- 9. D** — Appropriate skin antisepsis and avoiding recontamination reduce infection risk. If the site must be touched again, local policy may require renewed preparation and sterile technique. The correct choice is Disinfect the site and avoid repalpating it afterward. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective.
- 10. A** — A competent patient may withdraw consent. The technologist should stop, assess concerns, notify appropriate personnel, and document according to policy rather than coercing completion. The correct choice is Stop and address the patient's refusal. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Clear assessment and documentation support safe, reproducible care.
- 11. D** — Injection documentation creates a clear clinical record of access and administered material. It supports follow-up, reaction assessment, and quality review better than equipment or scheduling details alone. The correct choice is Site, catheter, contrast amount, concentration, and flow rate. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective.
- 12. B** — eGFR estimates kidney filtration and helps the clinical team assess renal risk before iodinated contrast. The other values may matter clinically, but they do not directly quantify filtration. The correct choice is eGFR. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Clear assessment and documentation support safe, reproducible care.
- 13. C** — Limited urticaria without airway or circulatory compromise is a mild allergic-like reaction. Progression, respiratory symptoms, or hypotension would raise the severity category and require more urgent intervention. The correct choice is Mild allergic-like reaction. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Clear assessment and documentation support safe, reproducible care.
- 14. A** — A time-out verifies the correct patient and intended procedure before scanning. Technical setup and archiving tasks are important, but they do not replace this safety confirmation. The correct choice is Confirm the patient, procedure, and site. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective.
- 15. C** — A large antecubital vein usually tolerates high flow more reliably than smaller distal vessels. Catheter condition, gauge, institutional policy, and patient factors must still be assessed. The correct choice is A large antecubital vein. The alternatives do not match the described CT principle, anatomy,

safety priority, or protocol objective. Clear assessment and documentation support safe, reproducible care.

16. B — Stopping the injection limits additional contrast from entering soft tissue. The site and patient are then assessed and managed according to local policy, with documentation and escalation when needed. The correct choice is Stop the injection immediately. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective.

17. D — Stridor suggests critical upper-airway compromise and requires immediate emergency response. Warmth, taste, and limited itching are usually less severe, though every patient must be observed for progression. The correct choice is Stridor with respiratory distress. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective.

18. C — Transfer aids and enough trained staff protect both patient and workers while maintaining alignment. Pulling, twisting, or expecting unsupported movement increases the risk of falls and musculoskeletal injury. The correct choice is Use an appropriate transfer device and adequate staff. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective.

19. B — Accessory devices can kink, disconnect, or become displaced during transfer. Securing and monitoring them preserves therapy and patient safety; it does not alter detector calibration or x-ray production. The correct choice is To prevent disconnection, tension, or loss of function. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective.

20. D — Appropriate skin antisepsis and avoiding recontamination reduce infection risk. If the site must be touched again, local policy may require renewed preparation and sterile technique. The correct choice is Disinfect the site and avoid repalpating it afterward. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective.

21. A — A competent patient may withdraw consent. The technologist should stop, assess concerns, notify appropriate personnel, and document according to policy rather than coercing completion. The correct choice is Stop and address the patient's refusal. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Clear assessment and documentation support safe, reproducible care.

22. D — Compton interactions dominate scatter production at diagnostic energies and reduce image contrast while contributing occupational exposure. Pair production and photodisintegration require much higher photon energies. The correct choice is Compton scattering. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

23. C — Compute directly from the values in the stem: 12×40 gives 480 mGy-cm. This calculation uses the standard relationship represented in the question. The correct choice is 480 mGy-cm. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

24. A — Dose-length product combines volume CT dose index with scanned length and is reported in mGy-cm. Display and reconstruction settings describe image presentation rather than total scan output. The correct choice is Dose-length product. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Clear assessment and documentation support safe, reproducible care.

25. B — Increasing pitch moves the table farther per rotation relative to beam width, usually reducing overlap and dose when other settings are fixed. Automatic controls can modify the exact result. The correct choice is Lower radiation dose. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective.

26. D — Pediatric protocols should match patient size and the diagnostic objective, limit coverage, and avoid unnecessary phases. Applying adult technique can deliver needless radiation. The correct choice is Tailor technique to patient size and clinical task. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective.

27. A — CTDIvol is a standardized index of scanner output based on phantom measurements. It helps compare protocols but is not the exact absorbed or effective dose for an individual patient. The correct choice is Standardized scanner radiation output for a protocol. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective.

28. C — Accurate centering improves localizer geometry and automatic exposure-control estimates. Off-centering can alter magnification, bow-tie filtration effects, dose, and image noise. The correct choice is To support proper dose modulation and image quality. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Clear assessment and documentation support safe, reproducible care.

29. B — Compute directly from the values in the stem: $80 * (1/2)^2$ gives 20 units. This calculation uses the standard relationship represented in the question. The correct choice is 20 units. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

30. C — Helical reconstruction needs projection data outside the prescribed image range, producing additional exposure near each end. This is called overranging and matters especially for short scan lengths. The correct choice is Irradiation beyond planned image boundaries for interpolation. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective.

31. D — The gray measures absorbed energy per unit mass. The sievert expresses radiation-weighted or effective dose, while the becquerel describes radioactive activity. The correct choice is Gray. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

32. B — The fixed control barrier provides designed shielding and distance during irradiation. Staff should not remain in the room unless clinically necessary and appropriately protected. The correct choice is Remain behind the protective control barrier. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Clear assessment and documentation support safe, reproducible care.

33. A — Compton interactions dominate scatter production at diagnostic energies and reduce image contrast while contributing occupational exposure. Pair production and photodisintegration require much higher photon energies. The correct choice is Compton scattering. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

34. C — The inverse square law states that intensity varies inversely with distance squared. Doubling distance therefore reduces intensity to one divided by two squared, or one fourth. The correct choice is One fourth. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Clear assessment and documentation support safe, reproducible care.

35. D — Dose-length product combines volume CT dose index with scanned length and is reported in mGy-cm. Display and reconstruction settings describe image presentation rather than total scan output. The correct choice is Dose-length product. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Clear assessment and documentation support safe, reproducible care.

36. B — Increasing pitch moves the table farther per rotation relative to beam width, usually reducing overlap and dose when other settings are fixed. Automatic controls can modify the exact result. The correct choice is Lower radiation dose. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective.

37. D — Pediatric protocols should match patient size and the diagnostic objective, limit coverage, and avoid unnecessary phases. Applying adult technique can deliver needless radiation. The correct choice is Tailor technique to patient size and clinical task. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective.

38. A — CTDIvol is a standardized index of scanner output based on phantom measurements. It helps compare protocols but is not the exact absorbed or effective dose for an individual patient. The correct choice is Standardized scanner radiation output for a protocol. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective.

39. C — Accurate centering improves localizer geometry and automatic exposure-control estimates. Off-centering can alter magnification, bow-tie filtration effects, dose, and image noise. The correct choice is To support proper dose modulation and image quality. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Clear assessment and documentation support safe, reproducible care.

40. B — More mAs produces more photons and improves counting statistics, reducing quantum noise. If other controls do not compensate, the additional tube output increases dose. The correct choice is Increasing mAs. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

41. A — Helical reconstruction needs projection data outside the prescribed image range, producing additional exposure near each end. This is called overranging and matters especially for short scan lengths. The correct choice is Irradiation beyond planned image boundaries for interpolation. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective.

42. C — The gray measures absorbed energy per unit mass. The sievert expresses radiation-weighted or effective dose, while the becquerel describes radioactive activity. The correct choice is Gray. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

43. D — The data acquisition system samples and digitizes detector output for reconstruction. It does not administer contrast, position patients, or manage consent records. The correct choice is Converts detector signals into digital data. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Clear assessment and documentation support safe, reproducible care.

44. B — Slip rings transfer electrical power and signals without cables winding around the gantry, enabling continuous rotation and helical acquisition. The correct choice is Slip-ring technology. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

45. A — Iterative reconstruction repeatedly compares estimated data with measured projections and updates the image, often reducing noise or supporting lower-dose protocols compared with conventional filtered backprojection. The correct choice is Iterative reconstruction. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

46. C — Pixel dimension equals display field of view divided by matrix dimension. A smaller display field with the same matrix therefore produces smaller pixels and can improve displayed spatial detail. The correct choice is Pixel size decreases. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective.

47. A — Compute directly from the values in the stem: $40 / 512$ gives 0.078125 cm. This calculation uses the standard relationship represented in the question. The correct choice is 0.078125 cm. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

- 48. B** — A detector element with an abnormal response traces a circular path as the gantry rotates, creating rings centered near the rotation axis. The correct choice is A miscalibrated or defective detector element. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Clear assessment and documentation support safe, reproducible care.
- 49. D** — Preferential absorption of lower-energy photons through dense bone hardens the beam and produces dark bands or streaks, particularly in the posterior fossa. The correct choice is Beam-hardening streaks. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.
- 50. A** — When a voxel contains more than one tissue, its displayed CT number represents an average, potentially obscuring small structures or mimicking pathology. The correct choice is Different tissues combined within one voxel. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Clear assessment and documentation support safe, reproducible care.
- 51. C** — Maximum intensity projection selects the highest voxel value along each viewing ray, making contrast-enhanced vessels and calcifications conspicuous. The correct choice is Maximum intensity projection. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.
- 52. D** — Minimum intensity projection displays the lowest attenuation values along each ray and can emphasize air-filled structures such as bronchi. The correct choice is Minimum intensity projection. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.
- 53. B** — Sharper kernels preserve high-frequency edge information and improve spatial resolution, but they usually increase image noise and may reduce low-contrast detectability. The correct choice is Spatial resolution. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.
- 54. A** — Overlapping images reduce stair-step appearance and provide denser sampling for reformations. They increase image count and storage but do not increase acquisition dose by themselves. The correct choice is Improved quality of MPR and 3D reformations. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective.
- 55. C** — Shorter acquisition windows reduce motion during data collection, improving temporal resolution for the beating heart. Display settings do not change acquisition timing. The correct choice is Shorter effective acquisition time. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

56. D — Raw data are detector measurements acquired from many angles before image reconstruction. Retaining them can permit reconstruction with different parameters. The correct choice is Unreconstructed projection measurements. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

57. C — DICOM defines formats and communication services for medical images and related information, supporting transfer between scanners, workstations, and archives. The correct choice is DICOM. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

58. B — Compute directly from the values in the stem: $48 / 32$ gives 1.5. This calculation uses the standard relationship represented in the question. The correct choice is 1.5. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

59. A — Helical CT combines continuous tube rotation with continuous table travel, creating a volumetric path through the patient. The correct choice is Helical acquisition. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

60. D — Dual-energy techniques acquire attenuation information at different spectra, allowing material decomposition and specialized reconstructions such as virtual noncontrast images. The correct choice is Material differentiation using energy-dependent attenuation. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

61. B — Thicker reconstructed slices combine more signal along the z-axis, improving photon statistics and reducing noise, though z-axis spatial resolution declines. The correct choice is Decreases noise. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

62. D — Uniformity testing compares measured CT numbers across regions of a homogeneous phantom to detect calibration or detector-response variation. The correct choice is Uniformity test. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

63. C — The Hounsfield scale assigns water approximately zero and air approximately minus one thousand. Routine quality control checks that water remains near its expected value. The correct choice is 0 HU. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

64. A — Compute directly from the values in the stem: $300 / 1.5$ gives 200 images. This calculation uses the standard relationship represented in the question. The correct choice is 200 images. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

65. B — With wide detector coverage, rays diverge along the z-axis and can violate assumptions of simpler reconstruction, producing characteristic artifacts. The correct choice is Wide detector arrays and imperfect z-axis reconstruction. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

66. A — A controlled warm-up gradually raises anode temperature, reducing abrupt thermal loading and helping protect the x-ray tube. The correct choice is To reduce thermal stress on the anode. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

67. C — Scan field of view determines the acquisition region for which projection data are collected and calibrated. Display field of view controls reconstruction display coverage. The correct choice is Scan field of view. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Clear assessment and documentation support safe, reproducible care.

68. B — When reconstruction spacing is smaller than section thickness, adjacent images overlap. This supports smoother reformations but increases the number of images. The correct choice is Creates overlapping images. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

69. D — The data acquisition system samples and digitizes detector output for reconstruction. It does not administer contrast, position patients, or manage consent records. The correct choice is Converts detector signals into digital data. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Clear assessment and documentation support safe, reproducible care.

70. C — Slip rings transfer electrical power and signals without cables winding around the gantry, enabling continuous rotation and helical acquisition. The correct choice is Slip-ring technology. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

71. B — Iterative reconstruction repeatedly compares estimated data with measured projections and updates the image, often reducing noise or supporting lower-dose protocols compared with conventional filtered backprojection. The correct choice is Iterative reconstruction. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

72. D — Pixel dimension equals display field of view divided by matrix dimension. A smaller display field with the same matrix therefore produces smaller pixels and can improve displayed spatial detail. The correct choice is Pixel size decreases. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective.

73. A — Compute directly from the values in the stem: $50 - 400/2$ gives -150 HU. This calculation uses the standard relationship represented in the question. The correct choice is -150 HU. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

74. C — A detector element with an abnormal response traces a circular path as the gantry rotates, creating rings centered near the rotation axis. The correct choice is A miscalibrated or defective detector element. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Clear assessment and documentation support safe, reproducible care.

75. B — Preferential absorption of lower-energy photons through dense bone hardens the beam and produces dark bands or streaks, particularly in the posterior fossa. The correct choice is Beam-hardening streaks. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

76. D — When a voxel contains more than one tissue, its displayed CT number represents an average, potentially obscuring small structures or mimicking pathology. The correct choice is Different tissues combined within one voxel. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Clear assessment and documentation support safe, reproducible care.

77. D — Maximum intensity projection selects the highest voxel value along each viewing ray, making contrast-enhanced vessels and calcifications conspicuous. The correct choice is Maximum intensity projection. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

78. A — Minimum intensity projection displays the lowest attenuation values along each ray and can emphasize air-filled structures such as bronchi. The correct choice is Minimum intensity projection. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

79. C — Sharper kernels preserve high-frequency edge information and improve spatial resolution, but they usually increase image noise and may reduce low-contrast detectability. The correct choice is Spatial resolution. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

80. A — Overlapping images reduce stair-step appearance and provide denser sampling for reformations. They increase image count and storage but do not increase acquisition dose by themselves. The correct choice is Improved quality of MPR and 3D reformations. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective.

81. B — Shorter acquisition windows reduce motion during data collection, improving temporal resolution for the beating heart. Display settings do not change acquisition timing. The correct choice is Shorter effective acquisition time. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

82. A — Raw data are detector measurements acquired from many angles before image reconstruction. Retaining them can permit reconstruction with different parameters. The correct choice is Unreconstructed projection measurements. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

83. D — DICOM defines formats and communication services for medical images and related information, supporting transfer between scanners, workstations, and archives. The correct choice is DICOM. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

84. C — PACS manages digital imaging studies so authorized users can store, retrieve, review, and distribute them across clinical systems. The correct choice is Storage, retrieval, and distribution of images. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

85. B — Helical CT combines continuous tube rotation with continuous table travel, creating a volumetric path through the patient. The correct choice is Helical acquisition. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

86. B — Dual-energy techniques acquire attenuation information at different spectra, allowing material decomposition and specialized reconstructions such as virtual noncontrast images. The correct choice is Material differentiation using energy-dependent attenuation. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

87. C — Thicker reconstructed slices combine more signal along the z-axis, improving photon statistics and reducing noise, though z-axis spatial resolution declines. The correct choice is Decreases noise. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

88. D — Compute directly from the values in the stem: $200 / 2$ gives 100 images. This calculation uses the standard relationship represented in the question. The correct choice is 100 images. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

89. A — The Hounsfield scale assigns water approximately zero and air approximately minus one thousand. Routine quality control checks that water remains near its expected value. The correct choice is 0 HU. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

90. A — Dividing the same display field among more pixels makes each pixel smaller, potentially improving in-plane sampling if other resolution limits permit. The correct choice is It decreases pixel size. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

91. C — With wide detector coverage, rays diverge along the z-axis and can violate assumptions of simpler reconstruction, producing characteristic artifacts. The correct choice is Wide detector arrays and imperfect z-axis reconstruction. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

92. D — A controlled warm-up gradually raises anode temperature, reducing abrupt thermal loading and helping protect the x-ray tube. The correct choice is To reduce thermal stress on the anode. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

93. B — Scan field of view determines the acquisition region for which projection data are collected and calibrated. Display field of view controls reconstruction display coverage. The correct choice is Scan field of view. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Clear assessment and documentation support safe, reproducible care.

94. C — When reconstruction spacing is smaller than section thickness, adjacent images overlap. This supports smoother reformations but increases the number of images. The correct choice is Creates overlapping images. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

95. A — Routine head CT data are commonly reviewed axially, with coronal and sagittal reformations added when helpful. The exact acquisition and reconstruction approach follows local protocol. The correct choice is Axial plane. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

96. B — Fresh intracranial blood is commonly hyperattenuating relative to brain on noncontrast CT. CSF, air, and chronic tissue loss are lower attenuation. The correct choice is Acute intracranial hemorrhage. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

97. D — Small temporal bone structures require thin sections and high-spatial-resolution bone reconstruction. Soft-tissue images may supplement but do not replace detailed bone images. The correct choice is Thin sections with a sharp bone kernel. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Clear assessment and documentation support safe, reproducible care.

98. A — Orbital CT assesses the globes, optic nerves, extraocular muscles, bony walls, and adjacent sinuses. The other structures belong to distant anatomic regions. The correct choice is Optic nerve. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

99. B — Sagittal multiplanar reformations clearly demonstrate vertebral alignment, body height, and posterior elements, complementing axial source images in trauma assessment. The correct choice is Sagittal MPR. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

100. D — Delayed excretory imaging allows filtered contrast to enter the calyces, renal pelvis, ureters, and bladder, demonstrating the urothelial tract. The correct choice is Excretory delayed phase. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

101. C — Compute directly from the values in the stem: $90 / 3$ gives 30 seconds. This calculation uses the standard relationship represented in the question. The correct choice is 30 seconds. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

102. B — A consistent inspiratory breath-hold expands the lungs and limits respiratory motion. The technologist should coach and rehearse instructions appropriate to the patient. The correct choice is Hold one full inspiration. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

103. D — HRCT emphasizes fine lung detail using thin sections and a sharp reconstruction, commonly with appropriate inspiratory technique and targeted reformations. The correct choice is Thin sections with a high-spatial-frequency kernel. The alternatives do not match the described CT principle, anatomy,

safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

104. A — Prospective triggering activates acquisition during selected portions of the cardiac cycle, often reducing dose compared with continuous retrospective gating when suitable. The correct choice is Prospective ECG triggering. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

105. C — Coronary calcium scoring quantifies calcified plaque on ECG-synchronized noncontrast images. Contrast-enhanced coronary angiography is a separate examination. The correct choice is No, the study is typically noncontrast. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

106. C — CTA timing aims for arterial opacification of the aorta and branches. Bolus tracking commonly places the monitoring region in the aorta. The correct choice is Abdominal aorta. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

107. D — Hypervascular liver lesions often enhance conspicuously during the late arterial phase, while portal venous and delayed phases provide complementary characterization. The correct choice is Late arterial phase. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

108. A — Portal venous phase imaging provides broad enhancement of abdominal viscera and portal veins, supporting evaluation of many common abdominal conditions. The correct choice is Portal venous phase. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

109. B — Urinary calculi are usually conspicuous without intravenous contrast. Thin-section noncontrast acquisition supports detection and multiplanar localization while avoiding contrast obscuration. The correct choice is Noncontrast thin-section CT. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

110. B — CT colonography depends on adequate cleansing or tagging and controlled colonic distention so the wall and lumen can be evaluated on 2D and 3D displays. The correct choice is Colon cleansing and gas distention. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Clear assessment and documentation support safe, reproducible care.

111. C — Sequential localization images confirm needle trajectory relative to the target and nearby critical structures. Sterile technique and patient monitoring remain essential. The correct choice is Intermittent localization imaging. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

112. A — The descending thoracic aorta courses through the posterior mediastinum. Recognizing mediastinal compartments helps localize masses and vascular disease. The correct choice is Descending thoracic aorta. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

113. D — Pulmonary veins return oxygenated blood to the left atrium. Pulmonary arteries carry deoxygenated blood from the right ventricle to the lungs. The correct choice is Pulmonary veins. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

114. D — The spleen lies beneath the left hemidiaphragm in the left upper quadrant. The gallbladder, cecum, and appendix are generally right-sided. The correct choice is Spleen. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

115. B — The right adrenal gland is often triangular, whereas the left is more semilunar. Shape and location help identify normal adrenal anatomy. The correct choice is Right adrenal gland. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

116. A — The portal vein usually forms from the superior mesenteric and splenic veins and carries nutrient-rich blood toward the liver. The correct choice is Portal vein. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

117. C — The pancreatic head occupies the C-shaped duodenal loop, while the body crosses midline and the tail approaches the splenic hilum. The correct choice is Head. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

118. D — The rectum courses anterior to the sacrum in the posterior pelvis. This relationship is important for pelvic anatomy and procedural planning. The correct choice is Rectum. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

119. A — The appendix arises from the cecum near the convergence of the taeniae coli. Following it in multiple planes improves diagnostic confidence. The correct choice is Vermiform appendix. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

120. C — CT cystography uses diluted contrast introduced retrograde through a urinary catheter to distend and evaluate the bladder for leakage. The correct choice is Retrograde instillation through a urinary catheter. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

121. B — MIP emphasizes high-attenuation contrast-filled vessels and is useful for overview, though source images and other reformations remain necessary. The correct choice is Maximum intensity projection. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

122. B — Most routine body CT examinations use supine positioning for stability, reproducibility, and safe table motion. Alternative positions are chosen for specific indications. The correct choice is Supine. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

123. C — Raising the arms removes dense upper-extremity structures from the beam path, reducing streak artifact and often improving dose modulation across the torso. The correct choice is To reduce beam-hardening artifact through the torso. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Clear assessment and documentation support safe, reproducible care.

124. A — A large pneumothorax with mediastinal displacement and compromised venous return is concerning for tension physiology and requires urgent communication. The correct choice is Pleural air with mediastinal shift. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

125. D — The lower medulla continues through the foramen magnum as the spinal cord. Major vertebral arteries and meninges also traverse this region. The correct choice is Medulla transitioning to spinal cord. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

126. C — The sphenoid sinus is centered in the sphenoid body beneath the sella. Its relationship to the pituitary and carotid canals is clinically important. The correct choice is Sphenoid sinus. The alternatives

do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

127. A — Coronal reformations show both sacroiliac joints along much of their craniocaudal extent, complementing axial images for erosions, fusion, or fracture. The correct choice is Coronal plane. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

128. D — Thin high-resolution bone reconstructions and orthogonal reformations reduce partial-volume effects and clarify cortical fracture lines and joint involvement. The correct choice is Thin-section bone algorithm with multiplanar reformations. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

129. B — Runoff CTA times contrast to assess arterial patency from the inflow vessels through the lower-extremity arteries, with coverage tailored to the indication. The correct choice is Arterial system from aorta through pedal vessels. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Clear assessment and documentation support safe, reproducible care.

130. B — Traversing aerated lung can allow air into the pleural space, so postprocedure assessment and imaging commonly evaluate for pneumothorax and bleeding. The correct choice is Pneumothorax. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

131. A — Routine head CT data are commonly reviewed axially, with coronal and sagittal reformations added when helpful. The exact acquisition and reconstruction approach follows local protocol. The correct choice is Axial plane. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

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135. C — Sagittal multiplanar reformations clearly demonstrate vertebral alignment, body height, and posterior elements, complementing axial source images in trauma assessment. The correct choice is Sagittal MPR. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

136. D — Delayed excretory imaging allows filtered contrast to enter the calyces, renal pelvis, ureters, and bladder, demonstrating the urothelial tract. The correct choice is Excretory delayed phase. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

137. A — CT pulmonary angiography is timed for dense pulmonary arterial enhancement so emboli appear as intraluminal filling defects. The correct choice is Main pulmonary artery. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

138. B — A consistent inspiratory breath-hold expands the lungs and limits respiratory motion. The technologist should coach and rehearse instructions appropriate to the patient. The correct choice is Hold one full inspiration. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

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141. C — Coronary calcium scoring quantifies calcified plaque on ECG-synchronized noncontrast images. Contrast-enhanced coronary angiography is a separate examination. The correct choice is No, the study is typically noncontrast. The alternatives do not match the described CT principle, anatomy,

safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

142. B — CTA timing aims for arterial opacification of the aorta and branches. Bolus tracking commonly places the monitoring region in the aorta. The correct choice is Abdominal aorta. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

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153. A — The pancreatic head occupies the C-shaped duodenal loop, while the body crosses midline and the tail approaches the splenic hilum. The correct choice is Head. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

154. B — The rectum courses anterior to the sacrum in the posterior pelvis. This relationship is important for pelvic anatomy and procedural planning. The correct choice is Rectum. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

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163. A — Coronal reformations show both sacroiliac joints along much of their craniocaudal extent, complementing axial images for erosions, fusion, or fracture. The correct choice is Coronal plane. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

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anatomy, safety priority, or protocol objective. Technologists should also consider the patient's condition and follow approved facility procedures before proceeding.

165. B — Runoff CTA times contrast to assess arterial patency from the inflow vessels through the lower-extremity arteries, with coverage tailored to the indication. The correct choice is Arterial system from aorta through pedal vessels. The alternatives do not match the described CT principle, anatomy, safety priority, or protocol objective. Clear assessment and documentation support safe, reproducible care.