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Preface

The field of radiography and medical imaging has seen significant advances over the past few decades, with the integration of advanced imaging techniques like computed tomography (CT), digital radiography, and AI-based diagnostics. This comprehensive collection of 1600 Multiple Choice Questions (MCQs) is curated to help radiography students, educators, and professionals prepare for academic assessments, licensure exams, and professional practice.

This MCQ bank covers a wide range of core topics such as radiographic positioning, anatomy and pathology, contrast media, digital systems (CR, DR, PACS), CT and MRI protocols, safety guidelines, artifacts, emergency radiography, and recent technological advances.

Each question is structured to challenge the learner's understanding and critical thinking ability, and includes a verified correct answer to promote active learning. The set also includes questions based on recent clinical scenarios, ensuring readiness for real-world application.

We hope this question bank serves as a reliable revision tool for exams such as:

- DSSSB Radiographer
- RRB Paramedical
- UPUMS, ESIC, PGIMER, AIIMS CRE
- Other State and National-Level Radiology Exams

We extend our sincere gratitude to all those who contributed to the development of this educational resource. Feedback and suggestions are always welcome to help improve future editions.

Send your suggestions or any corrections redtechofficial2020@gmail.com

“Practice is the path to mastery — and mastery in radiography begins here.”



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X-ray Physics & Equipment

1. X-rays are produced when electrons strike the:

- A. Filament
- B. Target
- C. Grid
- D. Housing

✓ **Answer: B. Target**

2. What material is commonly used for the anode target?

- A. Lead
- B. Copper
- C. Tungsten
- D. Molybdenum

✓ **Answer: C. Tungsten**

3. The function of the collimator is to:

- A. Focus the beam
- B. Increase contrast
- C. Reduce scatter radiation
- D. Magnify image

✓ **Answer: C. Reduce scatter radiation**

4. Line focus principle is used to:

- A. Increase exposure
- B. Reduce patient dose
- C. Improve resolution
- D. Increase filtration

✓ **Answer: C. Improve resolution**

5. The electron beam is generated from the:

- A. Target
- B. Grid
- C. Cathode
- D. Rotor

✓ **Answer: C. Cathode**



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6. The majority of X-ray tube energy is converted to:

- A. Light
- B. Heat
- C. Electricity
- D. Radiation

✓ **Answer: B. Heat**

7. Which exposure factor controls the energy of X-rays?

- A. mA
- B. kVp
- C. Time
- D. Focal spot

✓ **Answer: B. kVp**

8. Thermionic emission occurs at the:

- A. Anode
- B. Grid
- C. Filament
- D. Housing

✓ **Answer: C. Filament**

9. What type of current is required by the X-ray tube?

- A. AC
- B. DC
- C. Biphasic
- D. Pulsed

✓ **Answer: B. DC**

10. Rectifiers convert:

- A. AC to DC
- B. DC to AC
- C. Voltage to current
- D. Current to voltage

✓ **Answer: A. AC to DC**

11. What is the main reason for using high voltage in X-ray production?

- A. Improve contrast



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B. Increase exposure time

C. Accelerate electrons

D. Reduce noise

✓ **Answer: C. Accelerate electrons**

12. Focal spot blur decreases with:

A. Large focal spot

B. Small focal spot

C. Increased SID

D. Reduced filtration

✓ **Answer: B. Small focal spot**

13. Tube current is measured in:

A. kVp

B. mAs

C. mA

D. Ohms

✓ **Answer: C. mA**

14. X-rays travel in:

A. Circles

B. Zig-zag

C. Straight lines

D. Ellipses

✓ **Answer: C. Straight lines**

15. Beam hardening is caused by:

A. High mA

B. Filtration

C. Scatter

D. Grids

✓ **Answer: B. Filtration**

16. The protective housing of the tube prevents:

A. Electron leakage

B. Light scattering

C. Radiation leakage

D. Current drop

✓ **Answer: C. Radiation leakage**



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17. The process of filtering out low-energy X-rays is called:

- A. Attenuation
- B. Absorption
- C. Filtration
- D. Shielding

✓ **Answer: C. Filtration**

18. An increase in SID results in:

- A. More magnification
- B. Decreased exposure time
- C. Reduced magnification
- D. Image distortion

✓ **Answer: C. Reduced magnification**

19. The rotating anode helps to:

- A. Focus electrons
- B. Minimize exposure time
- C. Dissipate heat
- D. Reduce scatter

✓ **Answer: C. Dissipate heat**

20. The heel effect is most prominent in:

- A. Small field size
- B. Large SID
- C. Large field size
- D. Small anode angle

✓ **Answer: D. Small anode angle**

21. The tube envelope is made of:

- A. Plastic
- B. Glass
- C. Metal
- D. Lead

✓ **Answer: B. Glass**

22. What is the role of the focusing cup?

- A. Absorb X-rays
- B. Collimate the beam
- C. Direct electrons



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D. Increase resolution

✓**Answer: C. Direct electrons**

23. Bremsstrahlung radiation is produced when:

A. Electron collides with nucleus

B. Electron hits an outer shell

C. Photon is absorbed

D. Electron slows near nucleus

✓**Answer: D. Electron slows near nucleus**

24. Characteristic radiation occurs when:

A. Electron misses nucleus

B. Inner shell electron is ejected

C. Outer shell gains energy

D. Electron slows down

✓**Answer: B. Inner shell electron is ejected**

25. An increase in mAs will increase:

A. Energy of X-rays

B. Beam quality

C. Quantity of X-rays

D. Penetration

✓**Answer: C. Quantity of X-rays**

26. The space charge effect occurs at the:

A. Anode

B. Cathode

C. Housing

D. Filtration

✓**Answer: B. Cathode**

27. Leakage radiation must not exceed:

A. 1 mGy/hr

B. 100 mR/hr

C. 0.1 Gy/hr

D. 1 Gy/hr

✓**Answer: B. 100 mR/hr**



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28. The term attenuation refers to:

- A. Beam filtration
- B. Reduction in beam intensity
- C. Increase in energy
- D. Scattered dose

✓ **Answer: B. Reduction in beam intensity**

29. What determines the penetrating power of the beam?

- A. Filtration
- B. Distance
- C. kVp
- D. mA

✓ **Answer: C. kVp**

30. Which component maintains the vacuum in the X-ray tube?

- A. Filament
- B. Window
- C. Glass envelope
- D. Anode

✓ **Answer: C. Glass envelope**

31. What is the effect of increasing kVp?

- A. Less penetration
- B. More contrast
- C. More scattered radiation
- D. Lower image density

✓ **Answer: C. More scattered radiation**

32. The primary purpose of filtration is to:

- A. Increase image sharpness
- B. Reduce skin dose
- C. Increase mA
- D. Lower contrast

✓ **Answer: B. Reduce skin dose**

33. The anode angle affects:

- A. Speed of electrons
- B. Magnification
- C. Intensity distribution



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D. Focal spot blur

✓ **Answer: C. Intensity distribution**

34. What is used to control filament current?

A. Step-down transformer

B. Rectifier

C. Timer circuit

D. Grid control

✓ **Answer: A. Step-down transformer**

35. The rotating anode rotates at:

A. 100–200 rpm

B. 1000–3000 rpm

C. 3000–10000 rpm

D. 10–100 rpm

✓ **Answer: C. 3000–10000 rpm**

36. What happens to patient dose when mAs is doubled?

A. Unchanged

B. Doubled

C. Halved

D. Tripled

✓ **Answer: B. Doubled**

37. The oil in the X-ray tube housing is used for:

A. Cooling

B. Absorption

C. Shielding

D. Radiation production

✓ **Answer: A. Cooling**

38. Exposure time is controlled by the:

A. kVp meter

B. Timer circuit

C. Rectifier

D. Autotransformer

✓ **Answer: B. Timer circuit**



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39. The autotransformer is used to:

- A. Control mAs
- B. Regulate current
- C. Select voltage to primary circuit
- D. Store energy

✓ **Answer: C. Select voltage to primary circuit**

40. Focal spot size is selected on the basis of:

- A. Part size
- B. Patient age
- C. Exposure time
- D. Tube voltage

✓ **Answer: A. Part size**

41. The target angle is typically:

- A. 5–10°
- B. 10–15°
- C. 15–20°
- D. 25–30°

✓ **Answer: B. 10–15°**

42. Tungsten is ideal for anode due to:

- A. High melting point and atomic number
- B. Low melting point
- C. Low atomic number
- D. Transparency

✓ **Answer: A. High melting point and atomic number**

43. Filtration removes:

- A. High-energy photons
- B. Low-energy photons
- C. All radiation
- D. Scatter

✓ **Answer: B. Low-energy photons**

44. The inverse square law implies that:

- A. Distance increases exposure
- B. Intensity decreases as square of distance
- C. mA is inversely related to distance



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D. SID is constant

✓ **Answer: B. Intensity decreases as square of distance**

45. A rotating anode is used to:

A. Increase time

B. Improve sharpness

C. Dissipate heat over larger area

D. Improve collimation

✓ **Answer: C. Dissipate heat over larger area**

46. High-frequency generators produce:

A. Pulsed radiation

B. Continuous DC

C. Less ripple

D. Greater ripple

✓ **Answer: C. Less ripple**

47. Filament current is typically:

A. 1–3 A

B. 10–20 A

C. 50–60 A

D. 100 A

✓ **Answer: A. 1–3 A**

48. Grid frequency is measured in:

A. Hz

B. Lines/mm

C. mA

D. cm

✓ **Answer: B. Lines/mm**

49. Tube housing is lined with:

A. Copper

B. Steel

C. Lead

D. Aluminum

✓ **Answer: C. Lead**



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50. Anode is made to rotate using:

- A. Rotor and stator
- B. Rectifier
- C. Grid
- D. Transformer

✓ **Answer: A. Rotor and stator**

Radiographic Techniques & Positioning

51. The recommended SID for a chest PA projection is:

- A. 100 cm
- B. 120 cm
- C. 150 cm
- D. 180 cm

✓ **Answer: D. 180 cm**

52. Which position is best for detecting free peritoneal air?

- A. Supine
- B. Left lateral decubitus
- C. Upright abdomen
- D. Trendelenburg

✓ **Answer: C. Upright abdomen**

53. In lateral cervical spine radiography, exposure is taken during:

- A. Full inspiration
- B. Full expiration
- C. Suspended respiration
- D. Swallowing

✓ **Answer: C. Suspended respiration**

54. Water's view is used to evaluate:

- A. Mandible
- B. Sphenoid sinus
- C. Maxillary sinus
- D. Frontal bone

✓ **Answer: C. Maxillary sinus**



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55. The central ray for an AP lumbar spine view is at:

- A. L2
- B. L3
- C. Iliac crest
- D. T12

✓ **Answer: C. Iliac crest**

56. The radiographic position to evaluate a suspected pleural effusion in a non-ambulatory patient is:

- A. Upright PA
- B. Supine
- C. Left lateral decubitus
- D. Right lateral

✓ **Answer: C. Left lateral decubitus**

57. Which projection best demonstrates the intervertebral foramina of the cervical spine?

- A. Lateral
- B. Oblique
- C. AP
- D. Swimmer's view

✓ **Answer: B. Oblique**

58. Oblique views of the ribs are taken to:

- A. Visualize costal cartilage
- B. Reduce heart shadow
- C. Separate overlapping ribs
- D. Evaluate sternum

✓ **Answer: C. Separate overlapping ribs**

59. The CR for a PA hand radiograph is directed to:

- A. First MCP joint
- B. Second MCP joint
- C. Third MCP joint
- D. Wrist

✓ **Answer: C. Third MCP joint**

60. The frog-leg view is used to examine:

- A. Knee
- B. Pelvis



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- C. Hip joint
- D. Femoral shaft
- ✓ **Answer: C. Hip joint**

61. Which projection best demonstrates the coracoid process?

- A. Lateral shoulder
- B. AP internal rotation
- C. AP external rotation
- D. Axial shoulder
- ✓ **Answer: D. Axial shoulder**

62. The view to assess zygomatic arches is:

- A. PA skull
- B. Submentovertical (SMV)
- C. Lateral oblique
- D. Caldwell view
- ✓ **Answer: B. Submentovertical (SMV)**

63. Which view is preferred for demonstrating fluid in the maxillary sinus?

- A. Caldwell
- B. Lateral
- C. Open mouth Water's view
- D. PA skull
- ✓ **Answer: C. Open mouth Water's view**

64. The lateral projection of the skull should show:

- A. Mandibular condyles superimposed
- B. Superimposed orbital roofs
- C. Base of skull flat
- D. Facial bones symmetric
- ✓ **Answer: B. Superimposed orbital roofs**

65. What is the CR angle for AP axial sacrum?

- A. 5° caudal
- B. 15° caudal
- C. 15° cephalic
- D. 30° cephalic
- ✓ **Answer: C. 15° cephalic**



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66. The SI joints are best demonstrated with:

- A. Lateral pelvis
- B. AP pelvis
- C. 25° oblique view
- D. Frog-leg position

✓ **Answer: C. 25° oblique view**

67. The proper breathing instruction for chest X-ray is:

- A. Full inspiration
- B. Full expiration
- C. Breath hold
- D. Swallowing

✓ **Answer: A. Full inspiration**

68. What angle is used for axial clavicle view?

- A. 5° cephalic
- B. 10–15° caudal
- C. 15–30° cephalic
- D. 0°

✓ **Answer: C. 15–30° cephalic**

69. Oblique sternum view is best done with:

- A. Supine patient
- B. Erect PA
- C. RAO position
- D. LAO position

✓ **Answer: C. RAO position**

70. The radiographic view to show a pneumothorax best is:

- A. Expiratory PA chest
- B. Supine AP
- C. Upright PA
- D. Decubitus

✓ **Answer: A. Expiratory PA chest**

71. A sunrise view is used to evaluate:

- A. Femur shaft



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- B. Patella
- C. Tibial plateau
- D. Femoral head
- ✓ **Answer: B. Patella**

72. To demonstrate the odontoid process, use:

- A. Lateral cervical
- B. Swimmer's view
- C. Open-mouth view
- D. Oblique cervical
- ✓ **Answer: C. Open-mouth view**

73. What is the CR location for an AP knee view?

- A. Patella
- B. Mid femur
- C. 1/2 inch below patellar apex
- D. Femoral condyle
- ✓ **Answer: C. 1/2 inch below patellar apex**

74. The ulnar deviation position of the wrist is used to visualize the:

- A. Radius
- B. Carpal tunnel
- C. Scaphoid
- D. Hamate
- ✓ **Answer: C. Scaphoid**

75. The best projection for air-fluid levels in the abdomen is:

- A. Supine KUB
- B. Upright abdomen
- C. Lateral decubitus
- D. AP pelvis
- ✓ **Answer: B. Upright abdomen**

76. For trauma shoulder, the best lateral view is:

- A. AP internal rotation
- B. Y-view
- C. Axial projection
- D. External rotation
- ✓ **Answer: B. Y-view**



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77. A swimmer's view is used for:

- A. Cervico-thoracic junction
- B. Lumbosacral joint
- C. Sternoclavicular joint
- D. Acromioclavicular joint

✓ **Answer: A. Cervico-thoracic junction**

78. A decubitus chest X-ray should be done with:

- A. PA beam
- B. Lateral beam
- C. Vertical beam
- D. Axial beam

✓ **Answer: B. Lateral beam**

79. What is the angle for AP axial cervical spine?

- A. 5° cephalic
- B. 10° caudal
- C. 15–20° cephalic
- D. 30° caudal

✓ **Answer: C. 15–20° cephalic**

80. To examine the entire femur, which projections are required?

- A. AP and lateral hip
- B. AP and lateral femur (hip and knee included)
- C. Lateral pelvis and knee
- D. Frog-leg and AP pelvis

✓ **Answer: B. AP and lateral femur**

81. The PA Caldwell view uses a CR angle of:

- A. 15° cephalic
- B. 15° caudal
- C. 30° caudal
- D. 0°

✓ **Answer: B. 15° caudal**

82. Oblique views of the lumbar spine best show:

- A. Vertebral bodies



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- B. Transverse processes
- C. Pars interarticularis
- D. Spinous processes

✓ **Answer: C. Pars interarticularis**

83. Which view best demonstrates renal calculi?

- A. PA chest
- B. AP KUB
- C. Lateral abdomen
- D. IVU obliques

✓ **Answer: B. AP KUB**

84. The lateral nasal bone view shows:

- A. Frontal sinus
- B. Nasal bones
- C. Maxillary sinus
- D. Orbit

✓ **Answer: B. Nasal bones**

85. In a PA chest, the scapulae should be:

- A. Over lung fields
- B. Rotated out of the field
- C. Below diaphragm
- D. Not visible

✓ **Answer: B. Rotated out of the field**

86. For a scoliosis series, what position is preferred?

- A. Prone
- B. Supine
- C. Erect AP and lateral
- D. Cross-table lateral

✓ **Answer: C. Erect AP and lateral**

87. The sternoclavicular joints are best seen in:

- A. Lateral chest
- B. PA chest
- C. Oblique sternum
- D. RAO and LAO SC joint views

✓ **Answer: D. RAO and LAO SC joint views**



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88. The CR for a lateral ankle view is directed at:

- A. Tibial shaft
- B. Base of 5th metatarsal
- C. Medial malleolus
- D. Lateral malleolus

✓ **Answer: C. Medial malleolus**

89. The best view for paranasal sinuses is:

- A. Water's view
- B. SMV
- C. Caldwell
- D. Lateral

✓ **Answer: A. Water's view**

90. For thoracic spine AP projection, CR is at:

- A. T2
- B. T5
- C. T7
- D. T12

✓ **Answer: C. T7**

91. Lateral knee projection requires:

- A. 0° CR angle
- B. 5–7° cephalic angle
- C. 10° caudal angle
- D. 15° cephalic angle

✓ **Answer: B. 5–7° cephalic angle**

92. The sternum is best demonstrated in:

- A. Lateral chest
- B. RAO position
- C. AP thorax
- D. AP supine

✓ **Answer: B. RAO position**

93. The forearm must be in which position to see both joints clearly?

- A. Prone
- B. Supinated
- C. Flexed



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D. Extended

✓ **Answer: B. Supinated**

94. CR for a PA chest X-ray is at the level of:

A. Clavicles

B. Scapulae

C. T7

D. Xiphoid

✓ **Answer: C. T7**

95. The oblique hand view helps visualize:

A. Phalanges only

B. Carpal bones

C. Metacarpals and phalanges

D. Ulna

✓ **Answer: C. Metacarpals and phalanges**

96. The head is tilted in Water's view to:

A. Show occipital bone

B. Avoid superimposition

C. Show orbit

D. Visualize frontal sinus

✓ **Answer: B. Avoid superimposition**

97. The femoral neck can be best seen in:

A. Frog-leg lateral view

B. AP pelvis

C. Judet view

D. Lauenstein view

✓ **Answer: A. Frog-leg lateral view**

98. Proper patient positioning avoids:

A. Scatter

B. Motion artifacts

C. Beam hardening

D. Attenuation

✓ **Answer: B. Motion artifacts**



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99. Carpal tunnel view best visualizes:

- A. Radius
- B. Pisiform and hamate
- C. Ulna
- D. Trapezium

✓ **Answer: B. Pisiform and hamate**

100. The view that best evaluates scoliosis curvature is:

- A. Prone AP
- B. Standing AP
- C. Supine lateral
- D. Oblique lumbar

✓ **Answer: B. Standing AP**

Radiation Protection & Safety

101. The unit of effective dose is:

- A. Gray (Gy)
- B. Becquerel (Bq)
- C. Sievert (Sv)
- D. Coulomb/kg

✓ **Answer: C. Sievert (Sv)**

102. The main purpose of radiation protection is to:

- A. Increase image quality
- B. Reduce patient discomfort
- C. Minimize exposure to patients and staff
- D. Decrease equipment cost

✓ **Answer: C. Minimize exposure to patients and staff**

103. What is the annual occupational radiation dose limit for whole body?

- A. 10 mSv
- B. 20 mSv
- C. 50 mSv
- D. 100 mSv

✓ **Answer: C. 50 mSv**



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104. Which tissue is most radiosensitive?

- A. Bone
- B. Skin
- C. Gonads
- D. Muscle

✓ **Answer: C. Gonads**

105. The ALARA principle stands for:

- A. As Low As Reasonably Allowable
- B. As Long As Radiation Applies
- C. As Low As Reasonably Achievable
- D. As Low And Reliable Aim

✓ **Answer: C. As Low As Reasonably Achievable**

106. What type of radiation is produced by scatter?

- A. Primary
- B. Secondary
- C. Leakage
- D. Remnant

✓ **Answer: B. Secondary**

107. Which of the following provides protection from scatter radiation?

- A. Intensifying screen
- B. Lead apron
- C. Collimator
- D. High kVp

✓ **Answer: B. Lead apron**

108. Lead aprons used for radiation protection must be at least:

- A. 0.1 mm Pb equivalent
- B. 0.25 mm Pb equivalent
- C. 0.5 mm Pb equivalent
- D. 1.0 mm Pb equivalent

✓ **Answer: C. 0.5 mm Pb equivalent**

109. The most effective method of radiation protection is:

- A. Filtration
- B. Shielding
- C. Time



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D. Distance

✓**Answer: D. Distance**

110. A TLD badge measures:

A. Current

B. Magnetic field

C. Absorbed radiation dose

D. Heat

✓**Answer: C. Absorbed radiation dose**

111. The concept of stochastic effects implies:

A. Severity increases with dose

B. No threshold dose

C. Deterministic behavior

D. Dose-response is linear

✓**Answer: B. No threshold dose**

112. Deterministic effects are also known as:

A. Late effects

B. Threshold effects

C. Genetic effects

D. Cancerous effects

✓**Answer: B. Threshold effects**

113. The function of gonadal shielding is to:

A. Enhance image contrast

B. Protect reproductive organs

C. Reduce scatter

D. Prevent beam hardening

✓**Answer: B. Protect reproductive organs**

114. NCRP stands for:

A. National Council on Radiologic Personnel

B. National Commission on Radiographic Practice

C. National Council on Radiation Protection and Measurements

D. Nuclear Commission of Radiology Practice

✓**Answer: C. National Council on Radiation Protection and Measurements**



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115. Which organ has the lowest radiation weighting factor?

- A. Thyroid
- B. Skin
- C. Brain
- D. Colon

✓ **Answer: C. Brain**

116. Leakage radiation from tube housing should not exceed:

- A. 0.1 mGy/hr
- B. 1.0 mGy/hr
- C. 100 mR/hr at 1 meter
- D. 10 mSv/hr

✓ **Answer: C. 100 mR/hr at 1 meter**

117. What is the purpose of filtration in the X-ray tube?

- A. Increase beam quantity
- B. Increase contrast
- C. Remove low energy X-rays
- D. Protect grid

✓ **Answer: C. Remove low energy X-rays**

118. What is the cumulative occupational dose limit (in mSv)?

- A. Age in years \times 10
- B. Age in years \times 5
- C. 50 mSv/year
- D. 100 mSv lifetime

✓ **Answer: A. Age in years \times 10**

119. The minimum lead equivalence for thyroid shield is:

- A. 0.25 mm
- B. 0.35 mm
- C. 0.5 mm
- D. 1.0 mm

✓ **Answer: C. 0.5 mm**

120. The best method to protect a pregnant radiographer is:

- A. Time
- B. Wearing double apron
- C. Distance and shielding



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D. Wearing dosimeter under apron

✓ **Answer: C. Distance and shielding**

Radiation Protection & Safety

121. Which of the following is a stochastic effect of radiation?

A. Skin erythema

B. Cataract formation

C. Carcinogenesis

D. Hair loss

✓ **Answer: C. Carcinogenesis**

122. The most radiosensitive cell type is:

A. Nerve cell

B. Muscle cell

C. Lymphocyte

D. Osteocyte

✓ **Answer: C. Lymphocyte**

123. Which radiation effect has a dose threshold?

A. Cancer

B. Genetic mutations

C. Cataract

D. Leukemia

✓ **Answer: C. Cataract**

124. Which of the following is a radiation monitoring device?

A. Geiger counter

B. MRI

C. CT scan

D. TLD badge

✓ **Answer: D. TLD badge**

125. The three cardinal principles of radiation protection are:

A. Time, Distance, Shielding

B. Dose, Quality, Field size

C. Speed, Duration, Filtering

D. Contrast, Dose, Imaging

✓ **Answer: A. Time, Distance, Shielding**



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126. Which of the following does not provide protection from ionizing radiation?

- A. Lead screen
- B. Thyroid collar
- C. Lead apron
- D. Ultrasound gel

✓ **Answer: D. Ultrasound gel**

127. Which organ is most at risk during abdominal fluoroscopy?

- A. Heart
- B. Brain
- C. Thyroid
- D. Gonads

✓ **Answer: D. Gonads**

128. What is the purpose of a control booth in radiology?

- A. To monitor patient vitals
- B. To provide shielding for radiographers
- C. To reduce image blur
- D. To enhance radiation dose

✓ **Answer: B. To provide shielding for radiographers**

129. A pregnant technologist should wear a dosimeter:

- A. On the collar
- B. On the abdomen
- C. Outside the apron
- D. Under the apron at waist level

✓ **Answer: D. Under the apron at waist level**

130. A personal dosimeter must be worn:

- A. Only in CT rooms
- B. Outside lead apron at collar level
- C. On the wrist
- D. Inside the pocket

✓ **Answer: B. Outside lead apron at collar level**

131. Radiation dose to patients is lowest in which projection?

- A. AP abdomen
- B. PA chest
- C. Lateral lumbar



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D. AP pelvis

✓**Answer: B. PA chest**

132. What is the primary concern of radiobiology?

A. Image formation

B. Tube construction

C. Effects of radiation on cells

D. Contrast enhancement

✓**Answer: C. Effects of radiation on cells**

133. The genetic effects of radiation are caused by damage to:

A. Muscles

B. Blood cells

C. DNA

D. Bones

✓**Answer: C. DNA**

134. Which effect of radiation occurs years after exposure?

A. Erythema

B. Acute radiation syndrome

C. Genetic mutation

D. Fatigue

✓**Answer: C. Genetic mutation**

135. The most effective shielding for gamma rays is:

A. Lead

B. Aluminum

C. Wood

D. Plastic

✓**Answer: A. Lead**

136. Film badges are not ideal for:

A. Short-term monitoring

B. Heat and humidity environments

C. Detecting chronic exposure

D. Long-term staff tracking

✓**Answer: B. Heat and humidity environments**



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137. The maximum dose limit for the lens of the eye in occupational exposure is:

- A. 15 mSv/year
- B. 20 mSv/year
- C. 50 mSv/year
- D. 150 mSv/year

✓ **Answer: D. 150 mSv/year**

138. What is the half-value layer (HVL)?

- A. Half the beam length
- B. Half the photon energy
- C. Thickness of material to reduce intensity by half
- D. Radiation absorbed by half of body

✓ **Answer: C. Thickness of material to reduce intensity by half**

139. The term "dose equivalent" accounts for:

- A. Energy absorbed only
- B. Radiation type and tissue sensitivity
- C. Scatter only
- D. Distance from source

✓ **Answer: B. Radiation type and tissue sensitivity**

140. Which principle protects both staff and patients in fluoroscopy?

- A. High dose rate
- B. Use of filters
- C. Pulsed fluoroscopy
- D. Prolonged screening

✓ **Answer: C. Pulsed fluoroscopy**

141. During fluoroscopy, the operator should:

- A. Stand near the X-ray tube
- B. Use handheld shielding
- C. Wear an apron only
- D. Stand at head of table

✓ **Answer: B. Use handheld shielding**

142. The unit for absorbed dose is:

- A. Sv
- B. Gy
- C. mSv



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D. Rem

✓ **Answer: B. Gy**

143. A controlled area in radiology is one where:

- A. No radiation is present
- B. Staff has unrestricted access
- C. Access is limited and monitored
- D. Patients wait

✓ **Answer: C. Access is limited and monitored**

144. Which radiation effect has no threshold?

- A. Cataract
- B. Cancer
- C. Skin erythema
- D. Burns

✓ **Answer: B. Cancer**

145. The inverse square law helps to:

- A. Increase contrast
- B. Reduce scatter
- C. Estimate dose fall-off with distance
- D. Improve sharpness

✓ **Answer: C. Estimate dose fall-off with distance**

146. Annual public dose limit is:

- A. 1 mSv
- B. 10 mSv
- C. 20 mSv
- D. 50 mSv

✓ **Answer: A. 1 mSv**

147. What is the purpose of lead gloves?

- A. Improve image sharpness
- B. Protect technologist's hands
- C. Block X-rays completely
- D. Improve contrast

✓ **Answer: B. Protect technologist's hands**



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148. The biological damage potential of radiation depends on:

- A. Tissue density
- B. Energy only
- C. LET (Linear Energy Transfer)
- D. Equipment type

✓ **Answer: C. LET (Linear Energy Transfer)**

149. Which of the following is considered natural background radiation?

- A. CT scan
- B. Cosmic rays
- C. Fluoroscopy
- D. MRI

✓ **Answer: B. Cosmic rays**

150. A primary barrier in an X-ray room is designed to protect against:

- A. Scatter radiation
- B. Background radiation
- C. Primary beam
- D. Radio waves

✓ **Answer: C. Primary beam**

Contrast Media

151. The primary purpose of contrast media is to:

- A. Increase radiation dose
- B. Enhance image brightness
- C. Improve tissue differentiation
- D. Reduce motion artifact

✓ **Answer: C. Improve tissue differentiation**

152. Which of the following is a positive contrast agent?

- A. Air
- B. Carbon dioxide
- C. Barium sulfate
- D. Room air

✓ **Answer: C. Barium sulfate**



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153. Iodinated contrast is used for:

- A. USG
- B. MRI
- C. CT scan
- D. PET

✓ **Answer: C. CT scan**

154. What is a common side effect of IV contrast injection?

- A. Diarrhea
- B. Metallic taste
- C. Blurred vision
- D. Nausea only

✓ **Answer: B. Metallic taste**

155. Which contrast is contraindicated in suspected perforation?

- A. Water-soluble contrast
- B. Barium sulfate
- C. Non-ionic iodine
- D. Gastrografin

✓ **Answer: B. Barium sulfate**

156. Non-ionic iodinated contrasts are preferred because they:

- A. Are cheaper
- B. Cause less discomfort
- C. Are more radiopaque
- D. Have fewer side effects

✓ **Answer: D. Have fewer side effects**

157. Which test is done before contrast administration to assess kidney function?

- A. Serum potassium
- B. Blood sugar
- C. Serum creatinine
- D. Lipid profile

✓ **Answer: C. Serum creatinine**

158. High osmolality contrast media (HOCM) are more likely to cause:

- A. Nausea
- B. Diuresis
- C. Hypotension



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D. All of the above

✓ **Answer: D. All of the above**

159. Gadolinium is used in:

A. CT

B. MRI

C. Ultrasound

D. PET

✓ **Answer: B. MRI**

160. Contrast-induced nephropathy is more common in:

A. Diabetic patients

B. Pregnant women

C. Children

D. Cancer patients

✓ **Answer: A. Diabetic patients** Great! Here's the completion of the final part of your request:

Contrast Media

161. The risk of contrast reaction is highest in patients with:

A. Low BMI

B. Previous allergy to contrast

C. High blood pressure

D. History of cancer

✓ **Answer: B. Previous allergy to contrast**

162. The antidote for severe anaphylactic contrast reaction is:

A. Atropine

B. Epinephrine

C. Diphenhydramine

D. Hydrocortisone

✓ **Answer: B. Epinephrine**

163. What is a common delayed reaction to iodinated contrast?

A. Laryngospasm

B. Nausea

C. Rash or urticaria



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D. Vomiting

✓**Answer: C. Rash or urticaria**

164. Which is a low-osmolality contrast agent?

A. Iohexol

B. Diatrizoate

C. Gastrografin

D. Barium

✓**Answer: A. Iohexol**

165. Barium sulfate is contraindicated in:

A. Constipation

B. Suspected perforation

C. Small bowel obstruction

D. Crohn's disease

✓**Answer: B. Suspected perforation**

166. Gadolinium contrast should be avoided in:

A. Healthy children

B. Patients with severe renal failure

C. Cancer survivors

D. Pregnancy after 12 weeks

✓**Answer: B. Patients with severe renal failure**

167. The full form of RCM is:

A. Radiological Chemical Marker

B. Radiation-Coded Medium

C. Radiographic Contrast Material

D. Radiological Contrast Media

✓**Answer: D. Radiological Contrast Media**

168. The most serious type of contrast reaction is:

A. Mild rash

B. Vomiting

C. Anaphylaxis

D. Dizziness

✓**Answer: C. Anaphylaxis**



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169. Which of the following agents is NOT used as a contrast?

- A. Barium
- B. Iodine
- C. Gadolinium
- D. Glucose

✓ **Answer: D. Glucose**

170. For a barium meal study, the patient should:

- A. Eat high-fiber meal
- B. Take iron supplement
- C. Be NPO for 6 hours
- D. Drink 2L water

✓ **Answer: C. Be NPO for 6 hours**

171. Which contrast media is safest for IV injection?

- A. High-osmolality ionic
- B. Low-osmolality non-ionic
- C. Barium
- D. Water-soluble ionic

✓ **Answer: B. Low-osmolality non-ionic**

172. What is Gastrografin used for?

- A. MRI
- B. IV contrast for CT
- C. GI studies when perforation is suspected
- D. Renal studies

✓ **Answer: C. GI studies when perforation is suspected**

173. A patient with asthma has increased risk for:

- A. GI reaction
- B. Renal failure
- C. Contrast allergy
- D. Cardiac arrest

✓ **Answer: C. Contrast allergy**

174. The best route to administer contrast for IVU is:

- A. Intramuscular
- B. Intradermal
- C. Intravenous



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D. Intra-arterial

✓**Answer: C. Intravenous**

175. How long should metformin be withheld after contrast?

A. 6 hours

B. 12 hours

C. 24 hours

D. 48 hours

✓**Answer: D. 48 hours**

176. Which of the following contains iodine?

A. Gadolinium

B. Iohexol

C. Air

D. Dextrose

✓**Answer: B. Iohexol**

177. Contrast-induced nephropathy is indicated by:

A. High potassium

B. Elevated urea

C. Decreased GFR

D. Increased creatinine

✓**Answer: D. Increased creatinine**

178. Which of the following is a negative contrast agent?

A. Iodine

B. Barium

C. Air

D. Gadolinium

✓**Answer: C. Air**

179. Oral iodinated contrast is used for:

A. Head CT

B. Chest X-ray

C. GI tract opacification in CT

D. IVU

✓**Answer: C. GI tract opacification in CT**



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180. The risk of nephrotoxicity is higher with:

- A. Oral contrast
- B. Low-osmolality agents
- C. Repeated contrast studies
- D. Non-ionic contrast

✓ **Answer: C. Repeated contrast studies**

181. Gadolinium is classified as:

- A. Negative contrast agent
- B. Paramagnetic agent
- C. Radiopaque solid
- D. Organic dye

✓ **Answer: B. Paramagnetic agent**

182. Which statement about barium sulfate is false?

- A. It's radiopaque
- B. It can cause peritonitis if leaked
- C. It is absorbed systemically
- D. It is used in fluoroscopy

✓ **Answer: C. It is absorbed systemically**

183. A mild contrast reaction includes all except:

- A. Hives
- B. Warm sensation
- C. Shortness of breath
- D. Nausea

✓ **Answer: C. Shortness of breath**

184. Which of the following reduces contrast reaction risk?

- A. Fast injection
- B. Use of ionic contrast
- C. Pre-medication with steroids
- D. Room temperature injection

✓ **Answer: C. Pre-medication with steroids**

185. Osmolality of contrast determines:

- A. Color
- B. Viscosity
- C. Risk of side effects



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D. Density

✓**Answer: C. Risk of side effects**

186. Which of the following is an ionic contrast agent?

A. Iohexol

B. Iopamidol

C. Diatrizoate

D. Omnipaque

✓**Answer: C. Diatrizoate**

187. The route of administration for barium enema is:

A. Oral

B. IV

C. Rectal

D. Intrathecal

✓**Answer: C. Rectal**

188. Anaphylactoid reactions occur due to:

A. IgE antibody

B. Histamine release without prior exposure

C. RBC destruction

D. Cancer

✓**Answer: B. Histamine release without prior exposure**

189. In double contrast studies, air is used to:

A. Improve opacification

B. Decrease radiation

C. Distend hollow organs

D. Improve patient comfort

✓**Answer: C. Distend hollow organs**

190. Which of the following helps in renal protection during contrast CT?

A. Dehydration

B. NSAIDs

C. Adequate hydration

D. High contrast dose

✓**Answer: C. Adequate hydration**



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191. The best contrast agent for GI perforation is:

- A. Barium
- B. Iohexol
- C. Gastrografin
- D. Iopromide

✓ **Answer: C. Gastrografin**

192. Contrast used in MRI angiography is:

- A. Iodine
- B. Barium
- C. Gadolinium
- D. Air

✓ **Answer: C. Gadolinium**

193. Most contrast reactions occur within:

- A. 24 hours
- B. 15 minutes
- C. 1 hour
- D. 10 hours

✓ **Answer: B. 15 minutes**

194. Which of the following has the highest radiopacity?

- A. Bone
- B. Barium
- C. Water
- D. Air

✓ **Answer: B. Barium**

195. For IV contrast studies, an 18G cannula is:

- A. Too large
- B. Ideal for CT bolus
- C. Only for pediatrics
- D. Not recommended

✓ **Answer: B. Ideal for CT bolus**

196. Which lab test is vital before giving contrast?

- A. Hemoglobin
- B. Serum creatinine
- C. ALT



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D. WBC count

✓ **Answer: B. Serum creatinine**

197. The use of iodinated contrast is contraindicated in:

A. Asthma

B. Diabetes

C. Hyperthyroidism

D. Epilepsy

✓ **Answer: C. Hyperthyroidism**

198. Contrast extravasation can lead to:

A. Cancer

B. Infiltration and necrosis

C. Fever

D. Fracture

✓ **Answer: B. Infiltration and necrosis**

199. The half-life of iodinated contrast is approximately:

A. 10 mins

B. 30 mins

C. 1–2 hours

D. 12–24 hours

✓ **Answer: C. 1–2 hours**

200. The ideal contrast agent should be:

A. Highly viscous

B. High osmolality

C. Low toxicity and low osmolality

D. Inexpensive only

✓ **Answer: C. Low toxicity and low osmolality**

✓ congrats, You've now completed **200 Solved MCQs** on.

Digital Radiography: CR, DR & AI Integration



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Section A: Computed Radiography (CR)

201. In Computed Radiography, the image plate is coated with:

- A. Silver halide
- B. Photodiode
- C. Photostimulable phosphor
- D. Selenium

✓ **Answer: C. Photostimulable phosphor**

202. What is the most common phosphor material used in CR plates?

- A. Barium sulfate
- B. Calcium tungstate
- C. Barium fluorohalide
- D. Cesium iodide

✓ **Answer: C. Barium fluorohalide**

203. CR plates are read using:

- A. X-ray beam
- B. Laser beam
- C. UV light
- D. Infrared radiation

✓ **Answer: B. Laser beam**

204. The process of releasing stored energy in a CR plate is called:

- A. Photoconduction
- B. Photostimulation
- C. Photodetection
- D. Photoluminescence

✓ **Answer: B. Photostimulation**

205. What is the function of the photomultiplier tube (PMT) in CR readers?

- A. Amplifies laser
- B. Detects and amplifies light
- C. Releases X-rays
- D. Stores images

✓ **Answer: B. Detects and amplifies light**

206. Image plate erasure in CR is performed by:

- A. Red light



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- B. UV light
- C. White light
- D. Heat

✓ **Answer: C. White light**

207. Ghost image in CR is caused by:

- A. Low mA
- B. Motion artifact
- C. Incomplete plate erasure
- D. Beam hardening

✓ **Answer: C. Incomplete plate erasure**

208. CR systems replace the conventional:

- A. Cathode
- B. Film-screen cassette
- C. Grid
- D. Generator

✓ **Answer: B. Film-screen cassette**

209. What is one limitation of CR compared to DR?

- A. Slower workflow
- B. Higher resolution
- C. Better spatial resolution
- D. Real-time imaging

✓ **Answer: A. Slower workflow**

210. CR cassettes are more prone to:

- A. Saturation
- B. Wear and tear
- C. Overexposure
- D. Beam collimation

✓ **Answer: B. Wear and tear**

Section B: Digital Radiography (DR)

211. What is the key component in flat-panel DR detectors?

- A. Sodium iodide
- B. Selenium or cesium iodide
- C. Gold foil



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D. Helium gas

✓**Answer: B. Selenium or cesium iodide**

212. Direct DR systems convert X-rays into:

A. Sound waves

B. Heat

C. Electrical signals

D. Light

✓**Answer: C. Electrical signals**

213. Indirect DR systems use what intermediate step?

A. Heat

B. Ultrasound

C. Light from a scintillator

D. Magnetic fields

✓**Answer: C. Light from a scintillator**

214. A common scintillator material in indirect DR is:

A. Selenium

B. Silver bromide

C. Cesium iodide

D. Lead

✓**Answer: C. Cesium iodide**

215. What is the main advantage of DR over CR?

A. Cheaper setup

B. Smaller image size

C. Real-time image acquisition

D. Longer processing time

✓**Answer: C. Real-time image acquisition**

216. A CCD sensor in DR stands for:

A. Cathode capture device

B. Charge-coupled device

C. Circuit capture detector

D. Continuous cycle detector

✓**Answer: B. Charge-coupled device**



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217. Which DR detector is known for flexibility and portability?

- A. Fixed panel
- B. Wireless flat panel
- C. CRT monitor
- D. Intensifier tube

✓ **Answer: B. Wireless flat panel**

218. A drawback of indirect DR is:

- A. High dose
- B. Poor resolution
- C. Light scatter loss
- D. No electronic interface

✓ **Answer: C. Light scatter loss**

219. Digital detectors have higher efficiency due to:

- A. Smaller size
- B. Direct analog output
- C. Better DQE
- D. Higher cost

✓ **Answer: C. Better DQE** (*Detective Quantum Efficiency*)

220. In DR, the modulation transfer function (MTF) measures:

- A. Image storage capacity
- B. Image sharpness
- C. Pixel size
- D. Noise ratio

✓ **Answer: B. Image sharpness**

Section C: Artificial Intelligence (AI) in Radiology

221. AI in radiology is primarily used for:

- A. Film development
- B. Image annotation and detection
- C. Reducing mA
- D. Improving lead shielding

✓ **Answer: B. Image annotation and detection**



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222. What type of AI algorithm is most common in image analysis?

- A. Support vector machine
- B. Decision tree
- C. Convolutional neural network (CNN)
- D. Linear regression

✓ **Answer: C. Convolutional neural network (CNN)**

223. AI can improve radiology workflow by:

- A. Increasing radiation dose
- B. Automating repetitive tasks
- C. Delaying reporting
- D. Replacing equipment

✓ **Answer: B. Automating repetitive tasks**

224. One concern with AI in radiology is:

- A. High radiation dose
- B. Ethical and legal responsibility
- C. Limited accuracy
- D. No impact on diagnosis

✓ **Answer: B. Ethical and legal responsibility**

225. AI algorithms are trained using:

- A. Manual reports
- B. Real-time fluoroscopy
- C. Large annotated datasets
- D. MRI magnets

✓ **Answer: C. Large annotated datasets**

226. Which imaging modality has the most AI integration currently?

- A. Mammography
- B. PET
- C. Ultrasound
- D. Nuclear medicine

✓ **Answer: A. Mammography**

227. AI can help in triage of:

- A. Radiation dose
- B. Equipment servicing
- C. Critical imaging findings



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D. PACS storage

✓ **Answer: C. Critical imaging findings**

228. The term "deep learning" in AI refers to:

A. Learning protocols

B. Hierarchical layered neural networks

C. Long scan times

D. CT contrast learning

✓ **Answer: B. Hierarchical layered neural networks**

229. Limitations of AI in radiology include all EXCEPT:

A. Data dependency

B. Overfitting

C. Cost reduction

D. Bias in training data

✓ **Answer: C. Cost reduction**

230. AI systems improve over time through:

A. Hardware updates

B. Continuous training with new data

C. Contrast upgrades

D. Detector alignment

✓ **Answer: B. Continuous training with new data**

Section C: Artificial Intelligence (AI) in Radiology

231. Overfitting in AI refers to:

A. Model trained on perfect data

B. Model too generalized

C. Model performs well on training data but poorly on new data

D. Training with too many datasets

✓ **Answer: C. Model performs well on training data but poorly on new data**

232. Which of the following is a benefit of AI in radiology?

A. It increases reporting delays

B. Reduces diagnostic accuracy

C. Helps prioritize urgent cases



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D. Slows image processing

✓**Answer: C. Helps prioritize urgent cases**

233. One risk of relying too much on AI is:

A. Reduced contrast

B. Human oversight errors

C. Increased detector noise

D. Longer scan times

✓**Answer: B. Human oversight errors**

234. The ethical concern in AI decision-making is due to:

A. Software cost

B. Algorithm opacity ("black box")

C. Pixel saturation

D. High-resolution monitors

✓**Answer: B. Algorithm opacity ("black box")**

235. Radiomics refers to:

A. A radio-based imaging technique

B. Quantitative image feature extraction using AI

C. MRI scan types

D. Noise reduction system

✓**Answer: B. Quantitative image feature extraction using AI**

236. A model trained to detect fractures on X-rays is an example of:

A. PACS

B. DICOM

C. Supervised learning

D. Unsupervised learning

✓**Answer: C. Supervised learning**

237. What is required for training an AI model?

A. Unlabeled data

B. Annotated large datasets

C. One image

D. Analog film

✓**Answer: B. Annotated large datasets**



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238. AI models in chest X-ray interpretation help detect:

- A. Myocardial infarction
- B. Pneumothorax
- C. Ear infection
- D. Stroke

✓ **Answer: B. Pneumothorax**

239. What is the main goal of AI in diagnostic imaging?

- A. Replace radiographers
- B. Reduce staffing
- C. Assist in faster, more accurate interpretation
- D. Increase scanning time

✓ **Answer: C. Assist in faster, more accurate interpretation**

240. Which modality is using AI most widely for screening in radiology?

- A. MRI
- B. Mammography
- C. PET
- D. CT

✓ **Answer: B. Mammography**

Section D: Quality Assurance and System Integration

241. PACS allows for:

- A. Film storage
- B. Digital image acquisition only
- C. Image archiving and communication
- D. Contrast injection

✓ **Answer: C. Image archiving and communication**

242. DICOM ensures:

- A. Data deletion
- B. Interoperability between systems
- C. Scanner calibration
- D. Noise reduction

✓ **Answer: B. Interoperability between systems**



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243. RIS is used for:

- A. Radiation source control
- B. Radiology department workflow and scheduling
- C. Detector alignment
- D. Exposure recording

✓ **Answer: B. Radiology department workflow and scheduling**

244. The purpose of HL7 in radiology is to:

- A. Replace PACS
- B. Create 3D images
- C. Integrate patient information across systems
- D. Reduce scanning time

✓ **Answer: C. Integrate patient information across systems**

245. Exposure Index (EI) in DR indicates:

- A. mA setting
- B. Patient ID
- C. Radiation dose received by the detector
- D. Noise level

✓ **Answer: C. Radiation dose received by the detector**

246. Deviation Index (DI) is used to:

- A. Adjust window width
- B. Compare actual EI to target EI
- C. Measure contrast
- D. Calibrate tubes

✓ **Answer: B. Compare actual EI to target EI**

247. Overexposure in DR may lead to:

- A. Quantum mottle
- B. Saturation
- C. Bright image
- D. Grid cutoff

✓ **Answer: B. Saturation**

248. Which DR test measures spatial resolution?

- A. Step wedge
- B. Line pair phantom
- C. Spinning top test



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D. HVL test

✓ **Answer: B. Line pair phantom**

249. DR detectors are evaluated regularly to check:

A. Pixel defects

B. Image compression

C. Output screen voltage

D. TLD badge sensitivity

✓ **Answer: A. Pixel defects**

250. Quality control in DR ensures:

A. Overuse of mAs

B. Detector wear

C. Image quality and patient safety

D. Collimator decay

✓ **Answer: C. Image quality and patient safety**

Section D: Image Quality, Artifacts & Detector Parameters

251. The pixel is defined as:

A. A light ray

B. The smallest element in a digital image

C. A digital receptor

D. A type of contrast agent

✓ **Answer: B. The smallest element in a digital image**

252. Spatial resolution in digital radiography is directly affected by:

A. kVp

B. Bit depth

C. Pixel size

D. Field size

✓ **Answer: C. Pixel size**

253. Which of the following improves contrast resolution?

A. Higher matrix size

B. Lower pixel density

C. Lower bit depth



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D. Higher mAs

✓ **Answer: A. Higher matrix size**

254. DQE stands for:

A. Digital Quality Enhancement

B. Detector Quantum Efficiency

C. Dose Quality Equivalence

D. Diagnostic Quantitative Evaluation

✓ **Answer: B. Detector Quantum Efficiency**

255. What does a higher DQE mean?

A. More radiation used

B. Lower signal-to-noise ratio

C. Better image quality at lower dose

D. More post-processing needed

✓ **Answer: C. Better image quality at lower dose**

256. Which is not a type of image artifact in DR?

A. Grid cutoff

B. Backscatter

C. Halo artifact

D. Photostimulated luminescence

✓ **Answer: D. Photostimulated luminescence**

257. Grid cutoff appears as:

A. Increased image brightness

B. Uneven exposure

C. Geometric distortion

D. Ring artifact

✓ **Answer: B. Uneven exposure**

258. Flat panel artifacts are usually due to:

A. Detector calibration errors

B. Patient movement

C. Poor technique

D. Overexposure

✓ **Answer: A. Detector calibration errors**



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259. A histogram error can lead to:

- A. Increased radiation
- B. Poor image brightness and contrast
- C. Loss of DQE
- D. Detector failure

✓ **Answer: B. Poor image brightness and contrast**

260. Saturation artifact occurs when:

- A. mAs is too low
- B. Exposure exceeds detector capacity
- C. Histogram is incorrect
- D. No collimation is applied

✓ **Answer: B. Exposure exceeds detector capacity**

Section E: PACS, RIS, and Image Processing in DR

261. PACS stands for:

- A. Picture and Cardiology System
- B. Patient Assessment & Clinical Support
- C. Picture Archiving and Communication System
- D. Public Access to Clinical Services

✓ **Answer: C. Picture Archiving and Communication System**

262. The main advantage of PACS is:

- A. Paper-based reports
- B. Easy image sharing and storage
- C. Increase in radiation dose
- D. Decreased workflow

✓ **Answer: B. Easy image sharing and storage**

263. DICOM refers to:

- A. A radiology conference
- B. File format standard for images
- C. Nuclear imaging software
- D. Digital X-ray tube

✓ **Answer: B. File format standard for images**



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264. RIS stands for:

- A. Radiology Imaging Section
- B. Radiologic Information System
- C. Radiation Injury Survey
- D. Radiology In-Service

✓ **Answer: B. Radiologic Information System**

265. HIS and RIS integration improves:

- A. Equipment quality
- B. Departmental communication and reporting
- C. Patient radiation dose
- D. Power usage

✓ **Answer: B. Departmental communication and reporting**

266. A look-up table (LUT) is used for:

- A. Reducing exposure
- B. Determining filter values
- C. Mapping contrast in image processing
- D. PACS transmission

✓ **Answer: C. Mapping contrast in image processing**

267. The raw image data from the detector is referred to as:

- A. Final image
- B. Unprocessed image
- C. Archive file
- D. Film image

✓ **Answer: B. Unprocessed image**

268. Window level in post-processing controls:

- A. Image rotation
- B. Brightness
- C. Contrast
- D. Noise

✓ **Answer: B. Brightness**

269. Window width in post-processing controls:

- A. Sharpness
- B. Image speed
- C. Contrast



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D. Brightness

✓ **Answer: C. Contrast**

270. Image annotations and markers should be applied:

A. Post-processing

B. Pre-acquisition

C. In PACS

D. Before exposure

✓ **Answer: D. Before exposure**

Section F: Emerging Technologies & Quality Control

271. Which modality uses tomosynthesis?

A. CT

B. DR

C. Mammography

D. PET

✓ **Answer: C. Mammography**

272. Digital radiography exposure index (EI) reflects:

A. Patient ID

B. Actual dose received

C. Image quality

D. Detector size

✓ **Answer: B. Actual dose received**

273. AI can assist in dose monitoring by:

A. Reducing field size

B. Automated exposure tracking

C. Eliminating shielding

D. Replacing contrast

✓ **Answer: B. Automated exposure tracking**

274. What is a major benefit of wireless DR detectors?

A. Faster anode rotation

B. Portability and workflow efficiency

C. Increased mAs



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D. Lower pixel size

✓ **Answer: B. Portability and workflow efficiency**

275. What does auto-exposure control (AEC) do?

A. Adjusts collimation

B. Stops exposure when optimal dose is reached

C. Changes field of view

D. Moves detector

✓ **Answer: B. Stops exposure when optimal dose is reached**

276. DR systems require regular:

A. Film changing

B. Developer refills

C. Quality control testing

D. Cassette washing

✓ **Answer: C. Quality control testing**

277. Which of the following is tested in DR QC?

A. Image noise

B. Resolution

C. DQE

D. All of the above

✓ **Answer: D. All of the above**

278. Quantum mottle appears due to:

A. Low patient size

B. Overexposure

C. Too few X-ray photons

D. Backscatter

✓ **Answer: C. Too few X-ray photons**

279. AI is increasingly used in radiology for:

A. Image file compression

B. Diagnosing conditions

C. Equipment cooling

D. Manual collimation

✓ **Answer: B. Diagnosing conditions**



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280. Which innovation combines real-time AI triage with image acquisition?

- A. Smart CT
- B. Intelligent DR
- C. Deep Fluoro
- D. AI-guided acquisition systems

✓ **Answer: D. AI-guided acquisition systems**

CT Imaging –

Covering:

- CT Basics & Generations
 - CT Image Reconstruction
 - CT Artifacts
 - CT Contrast & Protocols
 - CT Safety & Dose
-

Section A: CT Basics & Generations (Q281–300)

281. CT stands for:

- A. Computerized Transmission
- B. Computed Tomography
- C. Contrast Tomogram
- D. Central Tomography

✓ **Answer: B. Computed Tomography**

282. The unit used to measure CT number is:

- A. Roentgen
- B. Sievert
- C. Hounsfield Unit
- D. Curie

✓ **Answer: C. Hounsfield Unit**

283. Water has a Hounsfield Unit (HU) of:

- A. -100
- B. 0



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- C. 100
- D. 1000

✓ **Answer: B. 0**

284. Air appears black in CT because its HU is:

- A. +1000
- B. 0
- C. -1000
- D. -100

✓ **Answer: C. -1000**

285. First-generation CT scanners used:

- A. Multiple detectors and fan beam
- B. Pencil beam and single detector
- C. Spiral scanning
- D. Slip ring technology

✓ **Answer: B. Pencil beam and single detector**

286. Which generation of CT introduced the fan beam?

- A. First
- B. Second
- C. Third
- D. Fourth

✓ **Answer: B. Second**

287. Spiral or helical CT became possible due to:

- A. Better collimators
- B. Slip ring technology
- C. Improved contrast media
- D. Higher slice thickness

✓ **Answer: B. Slip ring technology**

288. The gantry houses:

- A. X-ray tube and detectors
- B. Console
- C. PACS server
- D. Contrast injector

✓ **Answer: A. X-ray tube and detectors**



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289. Multislice CT allows for:

- A. Reduced image quality
- B. Longer scan times
- C. Multiple slices per rotation
- D. Single-slice per scan

✓ **Answer: C. Multiple slices per rotation**

290. The pitch in CT is defined as:

- A. Speed of rotation
- B. Table feed per rotation \div slice thickness
- C. $kVp \times mAs$
- D. Width of detector array

✓ **Answer: B. Table feed per rotation \div slice thickness**

291. Increasing pitch results in:

- A. Increased radiation dose
- B. Decreased scan time
- C. Higher image resolution
- D. Less coverage

✓ **Answer: B. Decreased scan time**

292. A CT scout view is similar to:

- A. Fluoroscopy
- B. X-ray
- C. MRI
- D. Ultrasound

✓ **Answer: B. X-ray**

293. In CT, voxel refers to:

- A. A CT detector
- B. Volume element
- C. Pixel on screen
- D. Image slice

✓ **Answer: B. Volume element**

294. A thinner slice thickness improves:

- A. Noise
- B. Spatial resolution
- C. Contrast resolution



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D. Beam hardening

✓ **Answer: B. Spatial resolution**

295. What is the typical kVp range in CT?

A. 50–70

B. 70–100

C. 100–140

D. 150–180

✓ **Answer: C. 100–140**

296. In CT, mAs controls:

A. Image sharpness

B. Exposure time

C. Radiation dose and noise

D. Number of detectors

✓ **Answer: C. Radiation dose and noise**

297. The CT number for bone is approximately:

A. -1000 HU

B. 0 HU

C. +200 to +1000 HU

D. -200 HU

✓ **Answer: C. +200 to +1000 HU**

298. CT gantry tilt is commonly used in:

A. Chest CT

B. Abdominal CT

C. Brain CT

D. Cardiac CT

✓ **Answer: C. Brain CT**

299. CT uses what kind of detector material?

A. Sodium iodide

B. Cesium bromide

C. Solid-state scintillators

D. Air ionization chambers

✓ **Answer: C. Solid-state scintillators**



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300. Window level in CT adjusts:

- A. Image contrast
- B. Image sharpness
- C. Image brightness
- D. mAs

✓ **Answer: C. Image brightness**

Section B: CT Image Reconstruction

301. The most commonly used image reconstruction method in modern CT is:

- A. Algebraic reconstruction
- B. Filtered back projection
- C. Simple back projection
- D. Pixel averaging

✓ **Answer: B. Filtered back projection**

302. Iterative reconstruction improves image quality by:

- A. Increasing scan time
- B. Reducing contrast
- C. Lowering image noise
- D. Increasing slice thickness

✓ **Answer: C. Lowering image noise**

303. Reconstruction algorithm also refers to:

- A. Voxel ratio
- B. Kernel or filter
- C. DICOM interface
- D. CT number

✓ **Answer: B. Kernel or filter**

304. The kernel in reconstruction affects:

- A. Only brightness
- B. Sharpness and noise
- C. Exposure
- D. Table movement

✓ **Answer: B. Sharpness and noise**



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305. Reconstruction slice thickness affects:

- A. Contrast
- B. Resolution and image volume
- C. Tube rotation
- D. Patient comfort

✓ **Answer: B. Resolution and image volume**

306. Axial images are obtained by:

- A. Continuous helical acquisition
- B. Sequential slice-by-slice scanning
- C. Subtraction technique
- D. Localizer scan

✓ **Answer: B. Sequential slice-by-slice scanning**

307. Multiplanar reconstruction (MPR) creates:

- A. Only axial images
- B. Functional data
- C. Coronal, sagittal, and oblique images
- D. Scout views

✓ **Answer: C. Coronal, sagittal, and oblique images**

308. 3D reconstruction in CT requires:

- A. Single slice acquisition
- B. Contrast agent
- C. Thin-slice helical data
- D. Increased window level

✓ **Answer: C. Thin-slice helical data**

309. The term "volume rendering" refers to:

- A. 2D image smoothing
- B. Raw data noise filtering
- C. 3D image reconstruction technique
- D. Gantry tilt

✓ **Answer: C. 3D image reconstruction technique**

310. In CT, MIP (Maximum Intensity Projection) is useful in:

- A. Bone imaging
- B. Vascular imaging
- C. Pelvic floor evaluation



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D. Oral contrast planning

✓ **Answer: B. Vascular imaging**

311. MPR images are formed using:

A. Raw data only

B. Image data (reconstructed axial images)

C. Scout views

D. DICOM files

✓ **Answer: B. Image data (reconstructed axial images)**

312. Thin slices are helpful for:

A. Increased noise

B. Better resolution

C. Less patient coverage

D. Shorter exposure

✓ **Answer: B. Better resolution**

313. Thicker slices help reduce:

A. Detail

B. Noise

C. Coverage area

D. Contrast dose

✓ **Answer: B. Noise**

314. In CT, interpolation is used for:

A. Enhancing artifacts

B. Making table motion smoother

C. Data filling between slices

D. PACS conversion

✓ **Answer: C. Data filling between slices**

315. Back projection alone causes:

A. Excellent resolution

B. Blurring of image

C. No image reconstruction

D. Dose doubling

✓ **Answer: B. Blurring of image**



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316. Isotropic voxels mean:

- A. Unequal height and width
- B. Equal pixel height and depth
- C. Equal dimensions in all axes
- D. Volume is low

✓ **Answer: C. Equal dimensions in all axes**

317. Reconstruction time depends on:

- A. Patient weight
- B. Gantry angle
- C. Computer processing speed
- D. Slice thickness

✓ **Answer: C. Computer processing speed**

318. The "soft tissue kernel" is used for:

- A. Lung imaging
- B. Brain and abdomen imaging
- C. Bone imaging
- D. Cardiac gating

✓ **Answer: B. Brain and abdomen imaging**

319. "Bone algorithm" is applied for:

- A. Soft organs
- B. Pediatrics
- C. High-resolution bony structures
- D. Contrast scanning

✓ **Answer: C. High-resolution bony structures**

320. Reconstruction matrix commonly used in CT is:

- A. 32×32
- B. 64×64
- C. 512×512
- D. 1024×1024

✓ **Answer: C. 512×512**



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Section C: CT Artifacts

321. A common CT artifact in dense bone is:

- A. Beam hardening
- B. Aliasing
- C. Ring artifact
- D. Motion artifact

✓ **Answer: A. Beam hardening**

322. Ring artifact is due to:

- A. Faulty pixel
- B. Patient motion
- C. Calibration error in detector element
- D. X-ray tube misalignment

✓ **Answer: C. Calibration error in detector element**

323. Streak artifacts are common with:

- A. Fatty tissue
- B. Metal implants
- C. Air-filled organs
- D. Contrast pooling

✓ **Answer: B. Metal implants**

324. Beam hardening creates a:

- A. Bright center
- B. Streak or cupping effect
- C. Blurred edge
- D. Pixel dropout

✓ **Answer: B. Streak or cupping effect**

325. Which artifact is seen in helical scanning with high pitch?

- A. Windmill artifact
- B. Ring artifact
- C. Cupping artifact
- D. Zipper artifact

✓ **Answer: A. Windmill artifact**

326. Motion artifact appears as:

- A. Ring



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- B. Straight lines
- C. Blurring or double images
- D. Patchy noise

✓ **Answer: C. Blurring or double images**

327. Partial volume artifact is reduced by:

- A. Increasing slice thickness
- B. Thinner slices
- C. Windowing
- D. Higher pitch

✓ **Answer: B. Thinner slices**

328. Aliasing artifact results from:

- A. Overexposure
- B. Under-sampling
- C. High mA
- D. Inadequate contrast

✓ **Answer: B. Under-sampling**

329. Edge gradient effect occurs at:

- A. Soft tissue borders
- B. Lung hilum
- C. Sharp density interfaces
- D. Muscle junctions

✓ **Answer: C. Sharp density interfaces**

330. How can metal artifact be reduced?

- A. Thicker slices
- B. Lower kVp
- C. Dual-energy CT or MAR algorithm
- D. Fast table speed

✓ **Answer: C. Dual-energy CT or MAR algorithm**

331. Ring artifacts appear mostly in:

- A. Brain imaging
- B. Chest CT
- C. Axial scans
- D. All CT scans with a faulty detector

✓ **Answer: D. All CT scans with a faulty detector**



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332. What is the best way to reduce motion artifact?

- A. Sedation
- B. Lower mA
- C. Increased pitch
- D. Reconstruction kernel

✓ **Answer: A. Sedation**

333. Incomplete calibration causes:

- A. Low contrast
- B. Cupping artifact
- C. Ring artifact
- D. Beam scatter

✓ **Answer: C. Ring artifact**

334. Cupping artifact refers to:

- A. Uniform noise
- B. Center of image appearing darker
- C. Oversaturation
- D. Pixelation

✓ **Answer: B. Center of image appearing darker**

335. Which CT artifact is most associated with barium contrast?

- A. Ring artifact
- B. Beam hardening
- C. Ghosting
- D. Zipper

✓ **Answer: B. Beam hardening**

Section D: CT Contrast Media & Protocols

336. The most common contrast agent in CT is:

- A. Barium sulfate
- B. Gadolinium
- C. Iodinated contrast
- D. Carbon dioxide

✓ **Answer: C. Iodinated contrast**



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337. Iodine-based contrast agents are classified as:

- A. Ionic and non-ionic
- B. Metallic and non-metallic
- C. Water-based and oil-based
- D. Oral and intravenous

✓ **Answer: A. Ionic and non-ionic**

338. Non-ionic contrast is preferred due to:

- A. Cheaper cost
- B. Better absorption
- C. Fewer side effects
- D. Higher viscosity

✓ **Answer: C. Fewer side effects**

339. The osmolality of contrast media affects:

- A. Noise level
- B. Image brightness
- C. Risk of reactions
- D. Scanner rotation

✓ **Answer: C. Risk of reactions**

340. What route is used for abdominal CT contrast injection?

- A. Intramuscular
- B. Intravenous
- C. Subcutaneous
- D. Intra-arterial

✓ **Answer: B. Intravenous**

341. Oral contrast in CT helps to:

- A. Visualize soft tissue masses
- B. Enhance liver function
- C. Distend and opacify GI tract
- D. Improve detector efficiency

✓ **Answer: C. Distend and opacify GI tract**

342. A typical oral contrast agent used is:

- A. Gadolinium
- B. Iodine IV
- C. Diluted barium sulfate or iodine solution



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D. Air

✓**Answer: C. Diluted barium sulfate or iodine solution**

343. Contraindication for iodinated contrast includes:

A. Asthma

B. Prior reaction

C. Renal failure

D. All of the above

✓**Answer: D. All of the above**

344. Premedication to prevent contrast reactions includes:

A. Atropine

B. Steroids and antihistamines

C. Paracetamol

D. Epinephrine

✓**Answer: B. Steroids and antihistamines**

345. In CT angiography (CTA), contrast timing is crucial to:

A. Avoid motion

B. Visualize arteries at peak enhancement

C. Reduce radiation

D. Prevent artifacts

✓**Answer: B. Visualize arteries at peak enhancement**

346. The “bolus tracking” technique in CTA is used to:

A. Check contrast pH

B. Scan after delay

C. Automatically trigger scan at peak contrast arrival

D. Increase injection pressure

✓**Answer: C. Automatically trigger scan at peak contrast arrival**

347. For pulmonary embolism, CTA is focused on:

A. Portal vein

B. Pulmonary arteries

C. Bronchial tree

D. Coronary arteries

✓**Answer: B. Pulmonary arteries**



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348. Delayed phase imaging in CT is useful for:

- A. Lymph node imaging
- B. Soft tissues
- C. Lesion characterization (e.g., liver hemangiomas)
- D. Pulmonary scan

✓ **Answer: C. Lesion characterization (e.g., liver hemangiomas)**

349. High injection rate of contrast is needed for:

- A. Brain scan
- B. Bone imaging
- C. CT angiography
- D. Abdomen without contrast

✓ **Answer: C. CT angiography**

350. The common IV contrast volume in adults for CT is:

- A. 5–10 mL
- B. 20–30 mL
- C. 50–150 mL
- D. >300 mL

✓ **Answer: C. 50–150 mL**

351. Contrast extravasation means:

- A. Contrast in kidney
- B. Leakage into surrounding tissue
- C. Contrast inside artery
- D. Delayed washout

✓ **Answer: B. Leakage into surrounding tissue**

352. Management of mild contrast reaction includes:

- A. Code blue
- B. Epinephrine IM
- C. Observation and antihistamines
- D. Surgery

✓ **Answer: C. Observation and antihistamines**

353. Contrast-induced nephropathy (CIN) refers to:

- A. Hepatic injury
- B. Lung toxicity
- C. Kidney damage after contrast use



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D. Neurotoxicity

✓ **Answer: C. Kidney damage after contrast use**

354. Which lab value is essential before giving iodinated contrast?

A. Hemoglobin

B. Platelet count

C. Serum creatinine

D. AST

✓ **Answer: C. Serum creatinine**

355. Risk of CIN is highest in patients with:

A. Hypertension

B. Elevated liver enzymes

C. Pre-existing renal impairment

D. Head trauma

✓ **Answer: C. Pre-existing renal impairment**

356. Which phase of contrast enhancement is ideal for detecting liver metastases?

A. Non-contrast phase

B. Arterial phase

C. Portal venous phase

D. Delayed phase

✓ **Answer: C. Portal venous phase**

357. For CT urogram, the excretory phase is typically acquired after:

A. 30 seconds

B. 1 minute

C. 5 minutes

D. 10–15 minutes

✓ **Answer: D. 10–15 minutes**

358. In CT perfusion studies, contrast is used to evaluate:

A. Renal cysts

B. Cerebral blood flow

C. Cardiac ejection fraction

D. Liver volume

✓ **Answer: B. Cerebral blood flow**



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359. Which protocol is used to evaluate renal artery stenosis?

- A. Triple-phase liver CT
- B. CT urogram
- C. CT angiography (CTA) of abdomen
- D. Delayed contrast-enhanced CT

✓ **Answer: C. CT angiography (CTA) of abdomen**

360. Which of the following is essential for cardiac CT imaging?

- A. High kVp
- B. Beta-blockers for HR control
- C. Oral contrast
- D. Scout image only

✓ **Answer: B. Beta-blockers for HR control**

361. CT enterography uses:

- A. IV gadolinium
- B. Water or low-density oral contrast
- C. Only IV iodine
- D. No contrast at all

✓ **Answer: B. Water or low-density oral contrast**

362. Split bolus technique in CT helps to:

- A. Increase radiation
- B. Reduce injection rate
- C. Combine nephrographic and excretory phases
- D. Avoid contrast use

✓ **Answer: C. Combine nephrographic and excretory phases**

363. Triphasic CT liver protocol includes:

- A. Non-contrast, arterial, portal venous
- B. Arterial, nephrographic, delayed
- C. Portal venous, equilibrium, delayed
- D. Arterial, corticomedullary, excretory

✓ **Answer: A. Non-contrast, arterial, portal venous**

364. CT of adrenal glands for adenoma uses:

- A. Dual-energy CT
- B. Washout protocol with delayed imaging
- C. Only non-contrast scan



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D. Oral contrast

✓ **Answer: B. Washout protocol with delayed imaging**

365. A dual-phase CT pancreas scan helps evaluate:

- A. Vascular anomalies
- B. Chronic pancreatitis only
- C. Islet cell tumors
- D. Pancreatic duct only

✓ **Answer: C. Islet cell tumors**

366. What is the typical delay for portal venous phase imaging?

- A. 10–15 seconds
- B. 20–30 seconds
- C. 60–70 seconds
- D. 120 seconds

✓ **Answer: C. 60–70 seconds**

367. Delayed phase imaging in CT kidneys evaluates:

- A. Renal arteries
- B. Cortical phase
- C. Excretion and pelvicalyceal system
- D. Contrast nephropathy

✓ **Answer: C. Excretion and pelvicalyceal system**

368. Which imaging plane is best for detecting abdominal aortic aneurysm on CT?

- A. Axial only
- B. Coronal
- C. Sagittal MPR
- D. Scout view

✓ **Answer: C. Sagittal MPR**

369. Which parameter helps reduce CT radiation dose in pediatrics?

- A. Increasing kVp
- B. Fixed tube current
- C. Automatic exposure control (AEC)
- D. Using thicker slices

✓ **Answer: C. Automatic exposure control (AEC)**



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370. Which of the following most significantly affects radiation dose in CT?

- A. Matrix size
- B. Gantry angle
- C. mAs and pitch
- D. Table height

✓ **Answer: C. mAs and pitch**

Section E: CT Dose, Safety & Radiation Protection

371. CT delivers higher dose than:

- A. Ultrasound
- B. X-ray
- C. MRI
- D. All of the above

✓ **Answer: D. All of the above**

372. Effective dose from a head CT is approx:

- A. 0.1 mSv
- B. 1 mSv
- C. 2 mSv
- D. 5–8 mSv

✓ **Answer: D. 5–8 mSv**

373. CTDI stands for:

- A. Contrast Dose Index
- B. Computed Tomography Dose Index
- C. Continuous Tube Dose Input
- D. CT Display Indicator

✓ **Answer: B. Computed Tomography Dose Index**

374. DLP in CT refers to:

- A. Dose Linearity Parameter
- B. Dose-Length Product
- C. Digital Log Profile
- D. Detector Level Performance

✓ **Answer: B. Dose-Length Product**

375. What factor most affects radiation dose in CT?

- A. Matrix size



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B. kVp and mAs

C. Pitch only

D. Field of view

✓ **Answer: B. kVp and mAs**

376. Increasing pitch:

A. Increases dose

B. Reduces dose

C. Has no effect

D. Increases tube current

✓ **Answer: B. Reduces dose**

377. AEC in CT stands for:

A. Automatic Exposure Control

B. Acute Emergency Code

C. Anterior Energy Computation

D. Advanced Electronic Circuit

✓ **Answer: A. Automatic Exposure Control**

378. Shielding in CT should be used for:

A. Spine

B. Extremities

C. Reproductive organs (if feasible)

D. Heart

✓ **Answer: C. Reproductive organs (if feasible)**

379. Pediatric patients need:

A. Higher kVp

B. Adult protocols

C. Tailored low-dose CT

D. No contrast

✓ **Answer: C. Tailored low-dose CT**

380. What does ALARA mean?

A. As Low As Reasonably Achievable

B. As Long As Radiation Accepts

C. All Levels Are Radiation Approved

D. Auto-Linked Artifact Reduction Algorithm

✓ **Answer: A. As Low As Reasonably Achievable**



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381. Overbeaming occurs due to:

- A. High kVp
- B. Unused peripheral radiation
- C. Detector saturation
- D. Gantry tilt

✓ **Answer: B. Unused peripheral radiation**

382. Organ most sensitive to radiation in CT scan is:

- A. Brain
- B. Skin
- C. Thyroid
- D. Liver

✓ **Answer: C. Thyroid**

383. Which protocol reduces CT dose most effectively?

- A. Routine abdomen scan
- B. Cardiac gated scan
- C. Low-dose chest CT
- D. Whole body CT

✓ **Answer: C. Low-dose chest CT**

384. Pregnant patient requiring CT should:

- A. Be denied scanning
- B. Undergo MRI
- C. Be evaluated carefully and scanned if benefit outweighs risk
- D. Always be scanned

✓ **Answer: C. Be evaluated carefully and scanned if benefit outweighs risk**

385. CT contrast reactions are most common in:

- A. Children
- B. Men
- C. Patients with prior allergies
- D. Diabetics

✓ **Answer: C. Patients with prior allergies**

386. Cumulative dose in CT must be monitored to:

- A. Ensure billing accuracy
- B. Prevent overheating
- C. Minimize long-term risks



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D. Calibrate scanner

✓**Answer: C. Minimize long-term risks**

387. CT localizer radiograph is also called:

A. Survey scan

B. Topogram or scout

C. DICOM header

D. Window width

✓**Answer: B. Topogram or scout**

388. MAR algorithm is used to reduce:

A. Noise

B. Beam hardening

C. Motion

D. Metal artifacts

✓**Answer: D. Metal artifacts**

389. CT gantry angle helps to:

A. Rotate the patient

B. Avoid radiosensitive organs

C. Align radiation

D. Reduce filtration

✓**Answer: B. Avoid radiosensitive organs**

390. Lead shielding in CT is typically:

A. Unnecessary

B. Used only in MRI

C. Not practical but sometimes used for eyes and thyroid

D. Used for image clarity

✓**Answer: C. Not practical but sometimes used for eyes and thyroid**

391. CT contrast should not be used in patients with:

A. Anemia

B. Diabetes insipidus

C. Anaphylaxis history

D. High cholesterol

✓**Answer: C. Anaphylaxis history**



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392. After contrast injection, patient should be observed for:

- A. 2–5 minutes
- B. 15–30 minutes
- C. 1 hour
- D. 24 hours

✓ **Answer: B. 15–30 minutes**

393. GFR below which contrast should be avoided (typically):

- A. <90 mL/min
- B. <70 mL/min
- C. <30 mL/min
- D. <10 mL/min

✓ **Answer: C. <30 mL/min**

394. Creatinine value contraindicating contrast:

- A. >0.6 mg/dL
- B. >1.2 mg/dL
- C. >2.0 mg/dL
- D. >5.0 mg/dL

✓ **Answer: C. >2.0 mg/dL**

395. CT-guided biopsy involves:

- A. Ultrasound
- B. Navigation system
- C. Real-time CT imaging
- D. Contrast injection

✓ **Answer: C. Real-time CT imaging**

396. Dual-energy CT improves:

- A. Patient movement
- B. Tissue characterization and material separation
- C. Dose
- D. Resolution

✓ **Answer: B. Tissue characterization and material separation**

397. Slice thickness in CT brain is typically:

- A. 10 mm
- B. 8 mm
- C. 5 mm or less



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D. 20 mm

✓ **Answer: C. 5 mm or less**

398. CT colonography is also called:

- A. Virtual colonoscopy
- B. Contrast barium enema
- C. Colon MRI
- D. Sigmoidoscopy

✓ **Answer: A. Virtual colonoscopy**

399. AI in CT dose modulation works by:

- A. Manual input
- B. Feedback from operator
- C. Real-time adjustments using algorithms
- D. Using lower kVp

✓ **Answer: C. Real-time adjustments using algorithms**

400. Multiphase CT is commonly used in:

- A. Brain infarct
- B. Fracture
- C. Liver lesion evaluation
- D. Thyroid nodule

✓ **Answer: C. Liver lesion evaluation**

MRI Imaging –

Topics Covered:

- MRI Physics & Instrumentation
- Image Formation
- MRI Sequences
- Safety & Contrast Agents
- Clinical MRI Applications



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Section A: MRI Physics & Instrumentation (Q401–420)

401. MRI stands for:

- A. Magnetic Resonance Imaging
- B. Mechanical Resonance Imaging
- C. Molecular Radiographic Imaging
- D. Magnetic Recording Imaging

✓ **Answer: A. Magnetic Resonance Imaging**

402. MRI is based on the principle of:

- A. X-ray absorption
- B. Ultrasound wave reflection
- C. Nuclear magnetic resonance
- D. Gamma emission

✓ **Answer: C. Nuclear magnetic resonance**

403. The main magnetic field in MRI is labeled as:

- A. B1
- B. B0
- C. B2
- D. M1

✓ **Answer: B. B0**

404. The most commonly used nucleus in clinical MRI is:

- A. Oxygen-16
- B. Carbon-13
- C. Hydrogen-1
- D. Nitrogen-14

✓ **Answer: C. Hydrogen-1**

405. The gyromagnetic ratio for hydrogen is approximately:

- A. 21 MHz/T
- B. 42.58 MHz/T
- C. 90 MHz
- D. 1.5 T

✓ **Answer: B. 42.58 MHz/T**



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406. Larmor frequency is directly proportional to:

- A. Pulse repetition time
- B. Magnetic field strength
- C. Echo time
- D. Matrix size

✓ **Answer: B. Magnetic field strength**

407. Gradient coils are responsible for:

- A. Cooling the scanner
- B. Producing the main magnetic field
- C. Spatial encoding
- D. Reducing artifacts

✓ **Answer: C. Spatial encoding**

408. The radiofrequency (RF) coil is used for:

- A. Producing image
- B. Measuring dose
- C. Sending and receiving signals
- D. Generating static field

✓ **Answer: C. Sending and receiving signals**

409. T1 relaxation refers to:

- A. Transverse decay
- B. Longitudinal recovery
- C. Echo delay
- D. Artifact removal

✓ **Answer: B. Longitudinal recovery**

410. T2 relaxation is also called:

- A. Longitudinal relaxation
- B. Magnetization recovery
- C. Transverse decay
- D. Image sharpening

✓ **Answer: C. Transverse decay**

411. A 1.5 Tesla MRI machine operates at approximately:

- A. 21 MHz
- B. 42 MHz
- C. 63 MHz



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D. 90 MHz

✓ **Answer: C. 63 MHz**

412. A stronger magnetic field leads to:

A. Shorter T2 times

B. Lower image resolution

C. Higher signal-to-noise ratio (SNR)

D. Weaker resonance

✓ **Answer: C. Higher signal-to-noise ratio (SNR)**

413. Superconducting magnets require:

A. Oil cooling

B. Permanent magnets

C. Cryogenic cooling with liquid helium

D. Dry air

✓ **Answer: C. Cryogenic cooling with liquid helium**

414. Shim coils in MRI are used to:

A. Cool the patient

B. Compress image data

C. Improve magnetic field homogeneity

D. Boost image contrast

✓ **Answer: C. Improve magnetic field homogeneity**

415. The time between RF pulse and echo signal is called:

A. TR (Repetition Time)

B. TE (Echo Time)

C. TI (Inversion Time)

D. Flip Angle

✓ **Answer: B. TE (Echo Time)**

416. The time between successive RF pulses is called:

A. TE

B. TI

C. TR

D. FA

✓ **Answer: C. TR (Repetition Time)**



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417. Flip angle determines:

- A. Direction of the magnetic field
- B. T1 and T2 contrast
- C. TR
- D. RF coil orientation

✓ **Answer: B. T1 and T2 contrast**

418. The number of signal averages (NSA or NEX) affects:

- A. Image sharpness
- B. Slice thickness
- C. Signal-to-noise ratio
- D. Patient weight

✓ **Answer: C. Signal-to-noise ratio**

419. What is the purpose of phase encoding?

- A. Change slice orientation
- B. Add contrast
- C. Encode spatial data in vertical axis
- D. Increase noise

✓ **Answer: C. Encode spatial data in vertical axis**

420. Slice selection gradient determines:

- A. Field of view
- B. Slice location and thickness
- C. Echo time
- D. Magnetic field direction

✓ **Answer: B. Slice location and thickness**

Section B: MRI Sequences (Q421–435)

421. The most basic MRI pulse sequence is:

- A. Gradient echo
- B. FLAIR
- C. Spin echo
- D. Inversion recovery

✓ **Answer: C. Spin echo**



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422. T1-weighted images are best for visualizing:

- A. Edema
- B. Acute hemorrhage and fat
- C. Air
- D. Bone cortex

✓ **Answer: B. Acute hemorrhage and fat**

423. T2-weighted images are best for detecting:

- A. Fatty tissue
- B. Cortical bone
- C. Fluid and edema
- D. Calcifications

✓ **Answer: C. Fluid and edema**

424. In T1 images, CSF appears:

- A. Bright
- B. Dark
- C. Grey
- D. Isointense

✓ **Answer: B. Dark**

425. FLAIR is used to suppress signal from:

- A. Gray matter
- B. CSF
- C. Bone
- D. Fat

✓ **Answer: B. CSF**

426. STIR sequence is specifically used to suppress:

- A. Water
- B. Air
- C. Fat
- D. Muscle

✓ **Answer: C. Fat**

427. Gradient echo sequences are useful for detecting:

- A. Fractures
- B. Iron and hemorrhage
- C. Bone marrow



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D. Gallstones

✓ **Answer: B. Iron and hemorrhage**

428. Inversion recovery is used to improve:

A. Image speed

B. Flow artifacts

C. Tissue contrast

D. Detector gain

✓ **Answer: C. Tissue contrast**

429. Echo planar imaging (EPI) is commonly used in:

A. Routine brain MRI

B. Diffusion-weighted imaging (DWI)

C. Cardiac perfusion

D. Lung MRI

✓ **Answer: B. Diffusion-weighted imaging (DWI)**

430. Susceptibility-weighted imaging (SWI) is useful for:

A. Liver lesions

B. Fluid detection

C. Microbleeds and iron deposits

D. Myocardial infarcts

✓ **Answer: C. Microbleeds and iron deposits**

431. The TR and TE in T1-weighted imaging are:

A. Long TR, Long TE

B. Short TR, Short TE

C. Short TR, Long TE

D. Long TR, Short TE

✓ **Answer: B. Short TR, Short TE**

432. The TR and TE in T2-weighted imaging are:

A. Short TR, Short TE

B. Long TR, Long TE

C. Short TR, Long TE

D. Long TR, Short TE

✓ **Answer: B. Long TR, Long TE**



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433. Flowing blood appears dark in:

- A. Spin echo
- B. FSE
- C. Gradient echo
- D. T1-weighted imaging

✓ **Answer: A. Spin echo**

434. K-space refers to:

- A. The patient's location
- B. The pixel array
- C. Frequency domain where raw data is stored
- D. Field gradient map

✓ **Answer: C. Frequency domain where raw data is stored**

435. Parallel imaging in MRI helps in:

- A. Slowing image reconstruction
- B. Artifact creation
- C. Reducing scan time
- D. Enhancing TE

✓ **Answer: C. Reducing scan time**

Section C: MRI Safety & Contrast (Q436–445)

436. Which of the following is absolutely contraindicated in MRI?

- A. Dental fillings
- B. Cochlear implants
- C. Hip prosthesis
- D. Tattoos

✓ **Answer: B. Cochlear implants**

437. The main risk of MRI is:

- A. Ionizing radiation
- B. Contrast allergy
- C. Projectile effect due to strong magnetic field
- D. Noise from scanner

✓ **Answer: C. Projectile effect due to strong magnetic field**



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438. MRI-safe implants are labeled as:

- A. MR Conditional
- B. MR Unsafe
- C. MR Rejected
- D. MR Required

✓ **Answer: A. MR Conditional**

439. The most common contrast used in MRI is based on:

- A. Iodine
- B. Barium
- C. Gadolinium
- D. Technetium

✓ **Answer: C. Gadolinium**

440. Gadolinium contrast affects:

- A. T1 shortening
- B. T2 shortening
- C. Both T1 and T2
- D. Field strength

✓ **Answer: A. T1 shortening**

441. NSF (Nephrogenic Systemic Fibrosis) is a complication of gadolinium in:

- A. Pregnant patients
- B. Diabetics
- C. Patients with renal failure
- D. Neonates

✓ **Answer: C. Patients with renal failure**

442. Gadolinium contrast is contraindicated if GFR is:

- A. <90 mL/min
- B. <60 mL/min
- C. <30 mL/min
- D. >100 mL/min

✓ **Answer: C. <30 mL/min**

443. MRI rooms are shielded to prevent:

- A. Image overexposure
- B. Radiofrequency interference
- C. Contrast pooling



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D. Air leakage

✓ **Answer: B. Radiofrequency interference**

444. Zone IV in MRI safety zones refers to:

A. Entry to hospital

B. Scanner room (most dangerous)

C. Waiting area

D. Dressing area

✓ **Answer: B. Scanner room (most dangerous)**

445. Ferromagnetic objects are prohibited because they:

A. Blur images

B. Cause nausea

C. Can turn into projectiles

D. Block RF signals

✓ **Answer: C. Can turn into projectiles**

Section D: Clinical Applications in MRI

451. Diffusion-weighted imaging (DWI) is most useful for detecting:

A. Brain hemorrhage

B. Acute cerebral infarction

C. Tumor size

D. CSF leak

✓ **Answer: B. Acute cerebral infarction**

452. The “bright” signal on DWI and “dark” on ADC map indicates:

A. Motion artifact

B. T2 shine-through

C. Restricted diffusion (e.g. infarct)

D. CSF pulsation

✓ **Answer: C. Restricted diffusion (e.g. infarct)**

453. Functional MRI (fMRI) maps:

A. Muscle density



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- B. Liver function
- C. Brain activity based on blood flow
- D. Lung perfusion
- ✓ **Answer: C. Brain activity based on blood flow**

454. BOLD contrast in fMRI depends on:

- A. Oxygen content in blood
- B. Gadolinium contrast
- C. Iodine absorption
- D. Muscle temperature
- ✓ **Answer: A. Oxygen content in blood**

455. MRI is the modality of choice for:

- A. Renal stones
- B. Spinal cord lesions
- C. Lung nodules
- D. Rib fractures
- ✓ **Answer: B. Spinal cord lesions**

456. MRCP (Magnetic Resonance Cholangiopancreatography) is used for imaging:

- A. Kidneys
- B. GI tract
- C. Biliary and pancreatic ducts
- D. Cardiac valves
- ✓ **Answer: C. Biliary and pancreatic ducts**

457. MRI of the knee is most sensitive for:

- A. Osteoporosis
- B. Ligament tears (e.g. ACL)
- C. Fracture detection
- D. Calcifications
- ✓ **Answer: B. Ligament tears (e.g. ACL)**

458. Cardiac MRI is excellent for evaluating:

- A. Lung cancer
- B. Pulmonary hypertension
- C. Myocardial viability and fibrosis
- D. Renal artery stenosis
- ✓ **Answer: C. Myocardial viability and fibrosis**



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459. MRI is preferred over CT in pediatrics due to:

- A. Cheaper cost
- B. Shorter scan time
- C. Lack of ionizing radiation
- D. Better bony detail

✓ **Answer: C. Lack of ionizing radiation**

460. In MR angiography (MRA), blood vessels are visualized using:

- A. Non-contrast techniques and gadolinium
- B. X-ray contrast
- C. Barium
- D. Doppler ultrasound

✓ **Answer: A. Non-contrast techniques and gadolinium**

461. A hyperintense lesion on T2-weighted imaging suggests:

- A. Acute infarct
- B. Chronic fibrosis
- C. Fluid content or edema
- D. Fat necrosis

✓ **Answer: C. Fluid content or edema**

462. MRI is superior to CT in:

- A. Lung parenchyma imaging
- B. Bone cortex evaluation
- C. Soft tissue contrast
- D. Radiation dose reduction

✓ **Answer: C. Soft tissue contrast**

463. MRI is contraindicated in patients with:

- A. Titanium prosthesis
- B. Pacemakers (unless MR-conditional)
- C. Non-ferromagnetic dental fillings
- D. Prior surgery

✓ **Answer: B. Pacemakers (unless MR-conditional)**

464. Which MRI sequence is most sensitive to hemorrhage?

- A. T1
- B. STIR
- C. Gradient Echo (GRE) or SWI



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D. FLAIR

✓ **Answer: C. Gradient Echo (GRE) or SWI**

465. MRI is helpful in multiple sclerosis due to:

- A. Better detection of spinal fluid
- B. Detection of demyelination in white matter
- C. Visualizing gray matter
- D. Bone density estimation

✓ **Answer: B. Detection of demyelination in white matter**

466. The modality of choice for pituitary tumor imaging is:

- A. Ultrasound
- B. CT
- C. MRI with contrast
- D. Plain X-ray

✓ **Answer: C. MRI with contrast**

467. The term "signal void" in MRI typically represents:

- A. Fat
- B. Metal
- C. Flowing blood or air
- D. Edema

✓ **Answer: C. Flowing blood or air**

468. In spinal MRI, cord compression appears as:

- A. Bright fat signal
- B. Displacement of CSF and spinal cord
- C. Linear signal dropout
- D. Artifact ring

✓ **Answer: B. Displacement of CSF and spinal cord**

469. Whole-body MRI is especially useful in:

- A. Osteoarthritis
- B. Rheumatoid arthritis
- C. Metastatic screening in cancer
- D. Stone disease

✓ **Answer: C. Metastatic screening in cancer**



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470. The most common MRI artifact in abdomen is:

- A. Motion artifact
- B. Metal artifact
- C. Chemical shift
- D. Wraparound artifact

✓ **Answer: A. Motion artifact**

Section E: Mixed Review & Rapid Recall

471. A 3 Tesla MRI scanner has how much field strength?

- A. 0.3 T
- B. 1.5 T
- C. 3 T
- D. 5 T

✓ **Answer: C. 3 T**

472. T2 shine-through refers to:

- A. Bright signal in T1
- B. DWI signal due to T2 properties
- C. Inverse contrast
- D. Iron deposition

✓ **Answer: B. DWI signal due to T2 properties**

473. Aliasing in MRI appears as:

- A. Bright ring
- B. Ghosting across image
- C. Truncation
- D. Chemical shift

✓ **Answer: B. Ghosting across image**

474. The role of shim coils is to:

- A. Adjust resonance frequency
- B. Suppress fat
- C. Homogenize magnetic field
- D. Increase TR

✓ **Answer: C. Homogenize magnetic field**



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475. The flip angle in MRI refers to:

- A. Scanner orientation
- B. Slice thickness
- C. Rotation of net magnetization vector
- D. Echo delay

✓ **Answer: C. Rotation of net magnetization vector**

476. Banding artifact is associated with:

- A. Gradient echo sequences
- B. FSE
- C. Fat saturation
- D. Balanced SSFP (steady-state free precession)

✓ **Answer: D. Balanced SSFP**

477. Phase-encoding gradient is applied:

- A. During echo
- B. Before RF pulse
- C. After slice selection
- D. At time of image reconstruction

✓ **Answer: C. After slice selection**

478. The parameter that most influences scan time is:

- A. TE
- B. Flip angle
- C. NEX/NSA
- D. Gradient rise time

✓ **Answer: C. NEX/NSA**

479. Artifacts due to breathing are reduced by:

- A. Short TE
- B. Cardiac gating
- C. Respiratory triggering
- D. Saturation bands

✓ **Answer: C. Respiratory triggering**

480. Gadolinium enhances lesions by:

- A. Increasing TE
- B. Decreasing signal
- C. Accumulating in disrupted blood-brain barrier



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D. Improving fat contrast

✓**Answer: C. Accumulating in disrupted blood-brain barrier**

481. Slice gap in MRI helps avoid:

A. Signal void

B. Crosstalk artifact

C. Field distortion

D. Eddy currents

✓**Answer: B. Crosstalk artifact**

482. Magnet quench refers to:

A. Scanner shut down by software

B. Emergency RF discharge

C. Sudden loss of superconductivity

D. Patient emergency

✓**Answer: C. Sudden loss of superconductivity**

483. Which parameter controls spatial resolution most directly?

A. TR

B. Matrix size and FOV

C. Flip angle

D. TI

✓**Answer: B. Matrix size and FOV**

484. Chemical shift artifact occurs at:

A. Air-tissue interface

B. Fat-water interface

C. Bone-cartilage interface

D. Blood-CSF interface

✓**Answer: B. Fat-water interface**

485. MR Spectroscopy is useful for analyzing:

A. Image resolution

B. Metabolites in tissue

C. Gradient strength

D. T1 signal

✓**Answer: B. Metabolites in tissue**



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486. TOF MRA stands for:

- A. Time-off-force
- B. Time-of-flight angiography
- C. Tube-of-focal imaging
- D. Timing of field

✓ **Answer: B. Time-of-flight angiography**

487. SAR in MRI refers to:

- A. Signal attenuation ratio
- B. Specific absorption rate (RF energy deposition)
- C. Slice acquisition resolution
- D. Scanner alert response

✓ **Answer: B. Specific absorption rate (RF energy deposition)**

488. Flow artifacts can be minimized by:

- A. Fat suppression
- B. Increasing TR
- C. Gradient moment nulling
- D. Reducing matrix size

✓ **Answer: C. Gradient moment nulling**

489. The echo train length (ETL) refers to:

- A. Number of T1 echoes
- B. Number of gradients used
- C. Number of echoes collected per TR in FSE
- D. Slice coverage

✓ **Answer: C. Number of echoes collected per TR in FSE**

490. TR = 2000 ms and TE = 100 ms refers to a:

- A. T1-weighted scan
- B. T2-weighted scan
- C. Proton density
- D. GRE sequence

✓ **Answer: B. T2-weighted scan**

491. T1-weighted images are best for viewing:

- A. Cerebrospinal fluid
- B. Bone marrow fat
- C. Edema



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D. Calcification

✓**Answer: B. Bone marrow fat**

492. MRI evaluation of TMJ is best done with:

A. T1-weighted imaging

B. Proton density

C. Open/closed mouth sagittal T2

D. CT scan

✓**Answer: C. Open/closed mouth sagittal T2**

493. MRI of liver hemangioma typically shows:

A. Hypointense mass

B. Peripheral nodular enhancement

C. No enhancement

D. Early washout

✓**Answer: B. Peripheral nodular enhancement**

494. Most sensitive MRI sequence for spinal cord lesion:

A. T1 axial

B. T2 sagittal

C. STIR sagittal

D. FLAIR

✓**Answer: C. STIR sagittal**

495. Gadolinium-enhanced MRI of brain tumors shows:

A. Ring-enhancement in high-grade glioma

B. Hypointense lesion

C. Signal dropout

D. Flow voids

✓**Answer: A. Ring-enhancement in high-grade glioma**

496. Myelination in infants is best monitored with:

A. T1 and T2 sequences

B. GRE

C. DWI

D. TOF

✓**Answer: A. T1 and T2 sequences**



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497. Cord syrinx is best detected by:

- A. T1 coronal
- B. T2 sagittal
- C. DWI axial
- D. GRE

✓ **Answer: B. T2 sagittal**

498. Which of the following is NOT an MR contrast agent?

- A. Gadopentetate
- B. Gadobutrol
- C. Barium sulfate
- D. Gadoteridol

✓ **Answer: C. Barium sulfate**

499. Which MRI artifact is exaggerated by metal implants?

- A. Ghosting
- B. Truncation
- C. Susceptibility artifact
- D. Chemical shift

✓ **Answer: C. Susceptibility artifact**

500. MR contrast excretion route is primarily via:

- A. Liver
- B. Lungs
- C. Kidneys
- D. Sweat

✓ **Answer: C. Kidneys**

Excellent! You have completed 500 Mcqs.

Ultrasound Imaging –

- **Topics: Basic Physics, Instrumentation, Artifacts & Clinical Principles**
-



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Section A: Basic Physics & Instrumentation

- **501. Ultrasound uses what type of waves for imaging?**
 - A. Ionizing radiation
 - B. Electromagnetic waves
 - C. Sound waves above 20 kHz
 - D. Sound waves below 20 Hz

✓ **Answer: C. Sound waves above 20 kHz**
- **502. The most commonly used frequencies in medical ultrasound are:**
 - A. 0.5–1 MHz
 - B. 2–15 MHz
 - C. 50–100 MHz
 - D. 100–200 kHz

✓ **Answer: B. 2–15 MHz**
- **503. As ultrasound frequency increases, resolution:**
 - A. Decreases
 - B. Increases
 - C. Remains the same
 - D. Becomes variable

✓ **Answer: B. Increases**
- **504. As ultrasound frequency increases, penetration:**
 - A. Increases
 - B. Decreases
 - C. Remains constant
 - D. Oscillates

✓ **Answer: B. Decreases**
- **505. The piezoelectric effect is used in:**
 - A. Image storage
 - B. Signal conversion in probes
 - C. Noise reduction
 - D. Contrast enhancement

✓ **Answer: B. Signal conversion in probes**
- **506. Axial resolution improves with:**
 - A. Lower frequency
 - B. Higher frequency
 - C. Lower gain
 - D. Increased depth

✓ **Answer: B. Higher frequency**



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- **507. Lateral resolution depends on:**
 - A. Frequency
 - B. Beam width
 - C. Time gain compensation
 - D. Pulse repetition frequency

✓ **Answer: B. Beam width**
- **508. The term “echogenic” refers to:**
 - A. Tissue with low water content
 - B. Tissue producing strong echoes
 - C. Dark structures on ultrasound
 - D. Flowing structures only

✓ **Answer: B. Tissue producing strong echoes**
- **509. The main component of an ultrasound transducer is:**
 - A. Crystal
 - B. Magnet
 - C. Wire grid
 - D. Capacitor

✓ **Answer: A. Crystal**
- **510. What is Time Gain Compensation (TGC)?**
 - A. Improves color Doppler
 - B. Compensates for signal loss with depth
 - C. Alters beam width
 - D. Changes contrast agent

✓ **Answer: B. Compensates for signal loss with depth**
- **511. Attenuation of sound in tissue is due to:**
 - A. Reflection, refraction, absorption, and scattering
 - B. Refraction only
 - C. Electrical impedance
 - D. Temperature

✓ **Answer: A. Reflection, refraction, absorption, and scattering**
- **512. Pulse repetition frequency (PRF) is related to:**
 - A. Axial resolution
 - B. Color saturation
 - C. Depth of imaging
 - D. Probe temperature

✓ **Answer: C. Depth of imaging**
- **513. Acoustic impedance is defined as:**
 - A. Density x speed of sound
 - B. Frequency / wavelength



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- C. Voltage x current
- D. Speed / attenuation
- ✓ **Answer: A. Density x speed of sound**
- **514. A-mode ultrasound displays:**
 - A. Real-time motion
 - B. Echo amplitude vs depth
 - C. Gray scale cross-section
 - D. Color flow✓ **Answer: B. Echo amplitude vs depth**
- **515. B-mode ultrasound provides:**
 - A. Brightness and 2D images
 - B. Motion recording
 - C. Blood velocity data
 - D. Audio output✓ **Answer: A. Brightness and 2D images**
- **516. M-mode is most commonly used in:**
 - A. Abdomen
 - B. Obstetrics
 - C. Echocardiography
 - D. Musculoskeletal✓ **Answer: C. Echocardiography**
- **517. In grayscale images, anechoic structures appear:**
 - A. White
 - B. Grey
 - C. Black
 - D. Red✓ **Answer: C. Black**
- **518. Ultrasound gel is used to:**
 - A. Increase contrast
 - B. Reduce scan time
 - C. Eliminate air between probe and skin
 - D. Enhance Doppler flow✓ **Answer: C. Eliminate air between probe and skin**
- **519. The most commonly used display mode is:**
 - A. A-mode
 - B. B-mode
 - C. M-mode
 - D. CW Doppler✓ **Answer: B. B-mode**



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- **520. The term “hypoechoic” means:**
 - A. No echo
 - B. High echo reflection
 - C. Low-level echoes
 - D. Variable color signal✓ **Answer: C. Low-level echoes**
 - **521. Acoustic shadowing is seen in:**
 - A. Liver hemangiomas
 - B. Fluid-filled cysts
 - C. Gallstones or bones
 - D. Fatty tissue✓ **Answer: C. Gallstones or bones**
 - **522. Reverberation artifact occurs due to:**
 - A. Rapid blood flow
 - B. Multiple reflections between two interfaces
 - C. High-frequency noise
 - D. Probe overuse✓ **Answer: B. Multiple reflections between two interfaces**
 - **523. Edge shadowing is due to:**
 - A. Artifact calibration
 - B. Attenuation of curved surfaces
 - C. Gain mismatch
 - D. Scattering of sound✓ **Answer: B. Attenuation of curved surfaces**
 - **524. Mirror image artifact is commonly seen in:**
 - A. Kidney
 - B. Lungs
 - C. Liver near diaphragm
 - D. Pelvis✓ **Answer: C. Liver near diaphragm**
 - **525. Ring-down artifact is caused by:**
 - A. Probe overheating
 - B. Gas bubbles resonance
 - C. Low scanning frequency
 - D. Contrast media✓ **Answer: B. Gas bubbles resonance**
-



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Section B: Doppler Imaging

- **526. Doppler ultrasound is used to assess:**
 - A. Tissue elasticity
 - B. Blood flow
 - C. Bone density
 - D. Contrast uptake✓ **Answer: B. Blood flow**
- **527. The Doppler effect refers to:**
 - A. Change in frequency due to moving reflector
 - B. Increase in amplitude with depth
 - C. Decrease in resolution with gain
 - D. Pulse delay in tissues✓ **Answer: A. Change in frequency due to moving reflector**
- **528. Color Doppler shows flow direction based on:**
 - A. Acoustic impedance
 - B. PRF
 - C. Phase difference
 - D. Frequency shift✓ **Answer: D. Frequency shift**
- **529. In color Doppler, blue typically indicates:**
 - A. Flow toward the transducer
 - B. Flow away from the transducer
 - C. No flow
 - D. Pulsed flow✓ **Answer: B. Flow away from the transducer**
- **530. Spectral Doppler displays:**
 - A. Flow in grayscale
 - B. Time vs velocity graph
 - C. Organ movement
 - D. 3D volume✓ **Answer: B. Time vs velocity graph**
- **531. Aliasing in pulsed Doppler occurs when:**
 - A. Gain is high
 - B. PRF is too low
 - C. Flow is laminar
 - D. Depth is shallow✓ **Answer: B. PRF is too low**



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- **532. Continuous wave Doppler is ideal for:**
 - A. Superficial veins
 - B. Accurate depth localization
 - C. High-velocity blood flow (e.g., heart valves)
 - D. Liver perfusion

✓Answer: C. High-velocity blood flow (e.g., heart valves)
- **533. Angle correction in Doppler is most accurate at:**
 - A. 0°
 - B. 45°
 - C. 60°
 - D. 90°

✓Answer: C. 60°
- **534. Wall filter in Doppler is used to:**
 - A. Enhance color
 - B. Reduce noise from vessel walls
 - C. Suppress aliasing
 - D. Improve resolution

✓Answer: B. Reduce noise from vessel walls
- **535. Power Doppler is more sensitive to:**
 - A. High velocity
 - B. Low flow
 - C. Large vessels
 - D. Bone edges

✓Answer: B. Low flow
- **536. Limitations of power Doppler include:**
 - A. Angle dependence
 - B. Directional information loss
 - C. Increased heat
 - D. Echo noise

✓Answer: B. Directional information loss
- **537. Doppler shift is directly proportional to:**
 - A. Speed of sound
 - B. Angle of insonation
 - C. Blood velocity
 - D. PRF

✓Answer: C. Blood velocity
- **538. Duplex ultrasound combines:**
 - A. Color and contrast
 - B. Gray-scale B-mode and spectral Doppler



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- C. Power Doppler and 3D
 - D. A-mode and B-mode
 - ✓ **Answer: B. Gray-scale B-mode and spectral Doppler**
 - **539. Pulsed Doppler allows measurement at:**
 - A. Any depth
 - B. High velocities only
 - C. Specific sample volume
 - D. Surface tissues✓ **Answer: C. Specific sample volume**
 - **540. Turbulent flow on spectral Doppler appears as:**
 - A. Clean spectral window
 - B. Thick, chaotic spectral waveform
 - C. Uniform line
 - D. Smooth wave with low amplitude✓ **Answer: B. Thick, chaotic spectral waveform**
 -
-

Section C: Clinical Applications

- **541. FAST scan in trauma evaluates for:**
 - A. Bowel obstruction
 - B. Hemorrhage or fluid in peritoneum
 - C. Fractures
 - D. Appendicitis✓ **Answer: B. Hemorrhage or fluid in peritoneum**
- **542. Ultrasound is preferred in obstetrics because it is:**
 - A. Cheapest
 - B. Ionizing
 - C. Portable and safe
 - D. Contrast-based✓ **Answer: C. Portable and safe**
- **543. The best modality to evaluate gallstones is:**
 - A. CT
 - B. MRI
 - C. Plain X-ray
 - D. Ultrasound✓ **Answer: D. Ultrasound**



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- **544. A thyroid nodule with microcalcifications suggests:**
 - A. Simple cyst
 - B. Benign goiter
 - C. Suspicion of malignancy
 - D. Parathyroid adenoma

✓Answer: C. Suspicion of malignancy
- **545. In early pregnancy, gestational sac is first seen at:**
 - A. 2 weeks
 - B. 4–5 weeks
 - C. 6–7 weeks
 - D. 10 weeks

✓Answer: B. 4–5 weeks
- **546. Bowel peristalsis can be assessed by:**
 - A. Color Doppler
 - B. Real-time B-mode
 - C. A-mode
 - D. Elastography

✓Answer: B. Real-time B-mode
- **547. In neonates, which area is scanned via fontanelle?**
 - A. Chest
 - B. Abdomen
 - C. Brain
 - D. Spine

✓Answer: C. Brain
- **548. For DVT diagnosis, the most useful technique is:**
 - A. A-mode imaging
 - B. Compression ultrasound with Doppler
 - C. Spectral-only imaging
 - D. B-mode only

✓Answer: B. Compression ultrasound with Doppler
- **549. In gynecology, transvaginal sonography provides:**
 - A. Poor resolution
 - B. Deeper penetration
 - C. High-resolution imaging of pelvic organs
 - D. Doppler-only view

✓Answer: C. High-resolution imaging of pelvic organs
- **550. The "double decidual sac sign" is seen in:**
 - A. Molar pregnancy
 - B. Ectopic pregnancy



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- C. Early intrauterine pregnancy
- D. Missed abortion
- ✓ **Answer: C. Early intrauterine pregnancy**

Section D: Advanced Clinical Applications

- **551. The “ring of fire” appearance on Doppler is associated with:**
 - A. Thyroid goiter
 - B. Corpus luteum cyst
 - C. Bladder carcinoma
 - D. Endometriosis✓ **Answer: B. Corpus luteum cyst**
- **552. The “target sign” in intussusception is best seen with:**
 - A. Color Doppler
 - B. B-mode transverse view
 - C. Elastography
 - D. A-mode✓ **Answer: B. B-mode transverse view**
- **553. The “double bubble” sign in ultrasound indicates:**
 - A. Duodenal atresia
 - B. Hydronephrosis
 - C. Ovarian torsion
 - D. Appendicitis✓ **Answer: A. Duodenal atresia**
- **554. The best imaging for testicular torsion is:**
 - A. X-ray
 - B. CT
 - C. Doppler ultrasound
 - D. MRI✓ **Answer: C. Doppler ultrasound**
- **555. The best modality to evaluate for fetal heart activity is:**
 - A. A-mode
 - B. B-mode
 - C. M-mode
 - D. CT✓ **Answer: C. M-mode**
- **556. The “snowstorm” pattern on ultrasound refers to:**
 - A. Normal fetal spine



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B. Hydatidiform mole

C. Multiple gestation

D. Gallbladder sludge

✓**Answer: B. Hydatidiform mole**

- **557. Hepatic hemangiomas appear on ultrasound as:**

A. Echogenic well-defined lesion

B. Anechoic structure

C. Hypoechoic mass with shadow

D. Ring calcification

✓**Answer: A. Echogenic well-defined lesion**

- **558. In renal ultrasound, hydronephrosis appears as:**

A. Hyperechoic renal cortex

B. Anechoic dilated renal pelvis

C. Shadowing of parenchyma

D. Solid hypoechoic mass

✓**Answer: B. Anechoic dilated renal pelvis**

- **559. The most sensitive modality for ectopic pregnancy is:**

A. X-ray

B. MRI

C. Transvaginal ultrasound

D. PET scan

✓**Answer: C. Transvaginal ultrasound**

- **560. The fetal biophysical profile includes all except:**

A. Fetal tone

B. Amniotic fluid volume

C. Fetal heart rate

D. Lung maturity by Lecithin:Sphingomyelin ratio

✓**Answer: D. Lung maturity by Lecithin:Sphingomyelin ratio**

- **561. The best window to scan neonatal brain is via:**

A. Coronal suture

B. Anterior fontanelle

C. Occipital bone

D. Parietal lobe

✓**Answer: B. Anterior fontanelle**

- **562. “String of pearls” sign in the ovary suggests:**

A. Endometrioma

B. Polycystic ovarian syndrome (PCOS)

C. Follicular cyst rupture



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- D. Tubal ectopic
✓ **Answer: B. Polycystic ovarian syndrome (PCOS)**
- **563. The “comet-tail” artifact is commonly seen in:**
 - A. Ascites
 - B. Gallbladder with adenomyomatosis
 - C. Bowel air
 - D. Pancreas✓ **Answer: B. Gallbladder with adenomyomatosis**
- **564. Shoulder dystocia risk is assessed by:**
 - A. Crown–rump length
 - B. Biparietal diameter
 - C. Femur length
 - D. Fetal abdominal circumference✓ **Answer: D. Fetal abdominal circumference**
- **565. Fetal growth restriction is diagnosed via:**
 - A. Umbilical artery Doppler
 - B. Middle cerebral artery CT
 - C. Fetal ECG
 - D. X-ray pelvimetry✓ **Answer: A. Umbilical artery Doppler**
- **566. In DVT assessment, a non-compressible vein indicates:**
 - A. Normal
 - B. Clot
 - C. Artery
 - D. Artifact✓ **Answer: B. Clot**
- **567. For appendix visualization in children, the best probe is:**
 - A. Curvilinear
 - B. Linear high-frequency
 - C. Sector
 - D. Intraoperative✓ **Answer: B. Linear high-frequency**
- **568. “Ghosting” in color Doppler is an artifact due to:**
 - A. Low velocity motion like tissue
 - B. High velocity aliasing
 - C. Probe overheating
 - D. Ring-down✓ **Answer: A. Low velocity motion like tissue**



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- **569. Liver fibrosis staging can be done using:**

- A. Doppler flow
- B. Elastography
- C. M-mode
- D. Contrast injection

✓ **Answer: B. Elastography**

- **570. Transcranial Doppler evaluates:**

- A. Lungs
- B. Liver
- C. Intracranial vessels
- D. Optic nerve

✓ **Answer: C. Intracranial vessels**

-

Section E: Mixed Review & Rapid Recall (Q576–600)

- **571. “Posterior acoustic enhancement” is typical of:**

- A. Solid tumor
- B. Simple cyst
- C. Calcified plaque
- D. Gas-filled bowel

✓ **Answer: B. Simple cyst**

- **572. Color aliasing is best resolved by:**

- A. Decreasing gain
- B. Increasing PRF
- C. Turning off TGC
- D. Changing frequency

✓ **Answer: B. Increasing PRF**

- **573. Portal vein flow is normally:**

- A. Hepatofugal
- B. Hepatopetal
- C. Pulsatile
- D. Non-detectable

✓ **Answer: B. Hepatopetal**

- **574. In obstetrics, the nuchal translucency is measured at:**

- A. 5–8 weeks
- B. 10–14 weeks



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C. 20–24 weeks

D. After 28 weeks

✓**Answer: B. 10–14 weeks**

- **575. Umbilical artery Doppler shows increased resistance in:**

A. Normal fetus

B. Fetal anemia

C. Fetal growth restriction

D. Fetal macrosomia

✓**Answer: C. Fetal growth restriction**

- **576. In pleural effusion, the diaphragm on ultrasound appears:**

A. Not visible

B. Echogenic and moving

C. Collapsed

D. Air-filled

✓**Answer: B. Echogenic and moving**

- **577. The most common cause of “dirty shadowing” in ultrasound is:**

A. Gallstone

B. Fat

C. Gas

D. Cyst

✓**Answer: C. Gas**

- **578. Contrast-enhanced ultrasound (CEUS) uses:**

A. Gadolinium

B. Microbubbles

C. Iodine

D. Glucose solution

✓**Answer: B. Microbubbles**

- **579. In musculoskeletal imaging, ultrasound is useful for:**

A. Bone cortex

B. Joint fluid and tendon tears

C. Marrow signal

D. Disk bulge

✓**Answer: B. Joint fluid and tendon tears**

- **580. A pseudokidney sign is seen in:**

A. Renal failure

B. Intussusception

C. Nephrolithiasis

D. Hydronephrosis

✓**Answer: B. Intussusception**



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- **581. Liver hemangioma in CEUS shows:**
 - A. No enhancement
 - B. Early washout
 - C. Peripheral nodular enhancement with fill-in
 - D. Central necrosis

✓ **Answer: C. Peripheral nodular enhancement with fill-in**
- **582. The “whirlpool sign” in Doppler is seen in:**
 - A. Mesenteric ischemia
 - B. Ovarian torsion
 - C. Varicocele
 - D. AV malformation

✓ **Answer: B. Ovarian torsion**
- **583. A simple renal cyst is:**
 - A. Echogenic
 - B. Complex and irregular
 - C. Anechoic with posterior enhancement
 - D. Calcified

✓ **Answer: C. Anechoic with posterior enhancement**
- **584. The best transducer for abdominal ultrasound is:**
 - A. High-frequency linear
 - B. Phased array
 - C. Curvilinear low-frequency
 - D. Endovaginal

✓ **Answer: C. Curvilinear low-frequency**
- **585. In 1st trimester, the yolk sac confirms:**
 - A. Ectopic pregnancy
 - B. Multiple pregnancy
 - C. Intrauterine pregnancy
 - D. Molar pregnancy

✓ **Answer: C. Intrauterine pregnancy**
- **586. The most common use of CEUS is for:**
 - A. Lung lesions
 - B. Breast masses
 - C. Liver lesions characterization
 - D. Bone tumors

✓ **Answer: C. Liver lesions characterization**
- **587. The "tip of the iceberg" sign indicates:**
 - A. Fibroid
 - B. Dermoid/teratoma



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- C. Ectopic pregnancy
- D. Hydrosalpinx
- ✓ **Answer: B. Dermoid/teratoma**
- **588. In Doppler, pulsatility index is calculated as:**
 - A. Systolic/diastolic ratio
 - B. (S-D)/mean
 - C. D/S
 - D. HR x PRF✓ **Answer: B. (S-D)/mean**
- **589. The ideal imaging for fetal anomaly scan is:**
 - A. Transvaginal at 6 weeks
 - B. Level II ultrasound at 18–20 weeks
 - C. MRI at 32 weeks
 - D. B-mode only✓ **Answer: B. Level II ultrasound at 18–20 weeks**
- **590. Umbilical vein Doppler is useful in:**
 - A. Hepatic fibrosis
 - B. Intrauterine growth restriction
 - C. Ectopic pregnancy
 - D. Renal anomalies✓ **Answer: B. Intrauterine growth restriction**
- **591. A “starry sky” liver pattern may indicate:**
 - A. Cirrhosis
 - B. Fatty liver
 - C. Acute hepatitis
 - D. Hemangioma✓ **Answer: C. Acute hepatitis**
- **592. Ureteric jet on Doppler confirms:**
 - A. Renal mass
 - B. Bladder outlet obstruction
 - C. Urine flow into bladder
 - D. Vesicoureteral reflux✓ **Answer: C. Urine flow into bladder**
- **593. Acoustic enhancement is helpful to identify:**
 - A. Calcification
 - B. Vascularity
 - C. Cysts
 - D. Tumors✓ **Answer: C. Cysts**



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- **594. Bowel gas artifact in ultrasound may cause:**
 - A. Ring down
 - B. Shadowing
 - C. Reverberation and loss of detail
 - D. Flow void

✓ **Answer: C. Reverberation and loss of detail**
- **595. Ovarian follicle rupture can appear as:**
 - A. Hyperechoic clot
 - B. Complex mass
 - C. Fluid in pouch of Douglas
 - D. Air artifact

✓ **Answer: C. Fluid in pouch of Douglas**
- **596. The gold standard for ectopic pregnancy is:**
 - A. hCG test
 - B. Transvaginal ultrasound
 - C. CT abdomen
 - D. MRI pelvis

✓ **Answer: B. Transvaginal ultrasound**
- **597. Elastography measures:**
 - A. Flow velocity
 - B. Tissue stiffness
 - C. Image gain
 - D. Hemodynamics

✓ **Answer: B. Tissue stiffness**
- **598. Color Doppler is unreliable in:**
 - A. Deep veins
 - B. Testicular torsion (late stage)
 - C. Carotid flow
 - D. Thyroid

✓ **Answer: B. Testicular torsion (late stage)**
- **599. CEUS avoids which contrast-related risk?**
 - A. Renal toxicity
 - B. Nausea
 - C. Hypotension
 - D. Bronchospasm

✓ **Answer: A. Renal toxicity**
- **600. The "banana sign" in fetal USG indicates:**
 - A. Normal cerebellum
 - B. Neural tube defect (spina bifida)



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C. Twin pregnancy

D. Hydrops fetalis

✓ **Answer: B. Neural tube defect (spina bifida)**

-
-
-
- Excellent! You have completed 600 Mcqs

Nuclear Medicine & Fluoroscopy

📖 Section A: Basics of Nuclear Medicine

- **601. Nuclear medicine imaging is based on:**
 - A. Ultrasound reflection
 - B. External radiation beams
 - C. Detection of gamma rays from radiotracers
 - D. X-ray attenuation✓ **Answer: C. Detection of gamma rays from radiotracers**
- **602. A radiopharmaceutical consists of:**
 - A. Contrast agent
 - B. Magnetic fluid
 - C. Radioactive isotope + pharmaceutical compound
 - D. Iodinated solution✓ **Answer: C. Radioactive isotope + pharmaceutical compound**
- **603. The most commonly used isotope in nuclear medicine is:**
 - A. Iodine-131
 - B. Technetium-99m
 - C. Fluorine-18
 - D. Gallium-68✓ **Answer: B. Technetium-99m**
- **604. The half-life of Tc-99m is approximately:**
 - A. 24 hours
 - B. 12 hours



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C. 6 hours

D. 1 hour

✓ **Answer: C. 6 hours**

- **605. The energy of gamma photons emitted by Tc-99m is:**

A. 511 keV

B. 140 keV

C. 364 keV

D. 1000 keV

✓ **Answer: B. 140 keV**

- **606. PET imaging commonly uses:**

A. Beta-emitting isotopes

B. Alpha particles

C. Positron-emitting isotopes

D. X-rays

✓ **Answer: C. Positron-emitting isotopes**

- **607. Fluorine-18 (F-18) is used in:**

A. MRI contrast

B. SPECT imaging

C. FDG-PET scans

D. Ultrasound Doppler

✓ **Answer: C. FDG-PET scans**

- **608. FDG is a radiolabeled form of:**

A. Water

B. Oxygen

C. Glucose

D. Fat

✓ **Answer: C. Glucose**

- **609. The principle of PET imaging is based on:**

A. Gamma camera detection

B. Positron annihilation and coincidence detection

C. Electron capture

D. Neutron emission

✓ **Answer: B. Positron annihilation and coincidence detection**

- **610. SPECT stands for:**

A. Single Photon Emission Computed Tomography

B. Spectral CT

C. Speed Pulse Emission CT

D. Scattered Photon Emission CT

✓ **Answer: A. Single Photon Emission Computed Tomography**



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- **611. In PET, the emitted positron interacts with:**
 - A. Electrons in tissue
 - B. Protons in blood
 - C. Neutrons in bone
 - D. Gamma rays

✓ **Answer: A. Electrons in tissue**
- **612. After positron–electron annihilation, what is emitted?**
 - A. One 140 keV photon
 - B. Two 511 keV photons in opposite directions
 - C. Beta rays
 - D. X-rays

✓ **Answer: B. Two 511 keV photons in opposite directions**
- **613. The main organ for excretion of most radiopharmaceuticals is:**
 - A. Liver
 - B. Lungs
 - C. Kidneys
 - D. Skin

✓ **Answer: C. Kidneys**
- **614. Gamma cameras work on the principle of:**
 - A. Fluorescent scattering
 - B. Thermionic emission
 - C. Scintillation detection of gamma rays
 - D. Photoelectric absorption

✓ **Answer: C. Scintillation detection of gamma rays**
- **615. Collimators in gamma cameras are used to:**
 - A. Focus X-rays
 - B. Filter low-energy particles
 - C. Allow gamma rays from specific directions
 - D. Produce images

✓ **Answer: C. Allow gamma rays from specific directions**
- **616. A pinhole collimator is best used for imaging:**
 - A. Brain
 - B. Spine
 - C. Thyroid
 - D. Abdomen

✓ **Answer: C. Thyroid**
- **617. The thyroid scan uses:**
 - A. Iodine-123 or Tc-99m
 - B. Gallium-68



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C. F-18 FDG

D. Xenon gas

✓ **Answer: A. Iodine-123 or Tc-99m**

- **618. Bone scintigraphy is most commonly done with:**

A. F-18 FDG

B. Tc-99m MDP

C. I-131

D. Tl-201

✓ **Answer: B. Tc-99m MDP**

- **619. A “hot” nodule in a thyroid scan typically indicates:**

A. Malignancy

B. Hyperfunctioning benign nodule

C. Cyst

D. Hypofunctioning nodule

✓ **Answer: B. Hyperfunctioning benign nodule**

- **620. A “cold” nodule may indicate:**

A. Normal thyroid tissue

B. Hyperthyroidism

C. Malignancy or cyst

D. Increased vascularity

✓ **Answer: C. Malignancy or cyst**

- **621. The dose of Tc-99m in adults for standard imaging is usually:**

A. 0.5–1 mCi

B. 2–5 mCi

C. 10–25 mCi

D. >50 mCi

✓ **Answer: C. 10–25 mCi**

- **622. What is the best imaging for myocardial perfusion studies?**

A. PET

B. MRI

C. Tc-99m SPECT

D. CT

✓ **Answer: C. Tc-99m SPECT**

- **623. For renal cortical imaging, the best agent is:**

A. Tc-99m DMSA

B. Tc-99m DTPA

C. Tc-99m MDP

D. I-123

✓ **Answer: A. Tc-99m DMSA**



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- **624. For dynamic renal function studies, the tracer used is:**

- A. Tc-99m DMSA
- B. Tc-99m DTPA
- C. F-18 FDG
- D. Tl-201

✓ **Answer: B. Tc-99m DTPA**

- **625. PET-CT combines:**

- A. CT anatomy with metabolic imaging from PET
- B. MRI with gamma detection
- C. USG with fluoroscopy
- D. Gamma rays with MR signals

✓ **Answer: A. CT anatomy with metabolic imaging from PET**

- **Section B: Fluoroscopy Basics & Techniques**

- **626. Fluoroscopy is primarily used to visualize:**

- A. Static cross-sections
- B. Real-time moving structures
- C. Bony alignment
- D. Tissue histology

✓ **Answer: B. Real-time moving structures**

- **627. Fluoroscopy uses which type of radiation?**

- A. Ultrasound
- B. Gamma rays
- C. X-rays (continuous or pulsed)
- D. Radio waves

✓ **Answer: C. X-rays (continuous or pulsed)**

- **628. The primary component of the image receptor in conventional fluoroscopy is:**

- A. Flat-panel detector
- B. CT sensor
- C. Image intensifier
- D. MRI coil

✓ **Answer: C. Image intensifier**

- **629. The output phosphor of the image intensifier converts:**

- A. X-rays into sound
- B. Electrons into light
- C. Light into electrons



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D. Gamma rays into heat

✓ **Answer: B. Electrons into light**

- **630. The input phosphor of an image intensifier is usually made of:**

A. Sodium iodide

B. Cesium iodide

C. Barium sulfate

D. Calcium carbonate

✓ **Answer: B. Cesium iodide**

- **631. The primary advantage of pulsed fluoroscopy over continuous is:**

A. Higher dose

B. Lower frame rate

C. Reduced patient radiation dose

D. Better anatomic detail

✓ **Answer: C. Reduced patient radiation dose**

- **632. Automatic Brightness Control (ABC) in fluoroscopy adjusts:**

A. Collimation

B. Fluoroscopy timer

C. Tube current and voltage

D. Table tilt

✓ **Answer: C. Tube current and voltage**

- **633. The SNR in digital fluoroscopy improves by:**

A. Decreasing exposure

B. Using high-resolution screens

C. Increasing radiation dose

D. Using digital subtraction

✓ **Answer: C. Increasing radiation dose**

- **634. Digital subtraction angiography (DSA) is most useful in:**

A. Liver lesions

B. Joint studies

C. Vascular imaging

D. Thyroid nodules

✓ **Answer: C. Vascular imaging**

- **635. In DSA, subtraction removes:**

A. Motion

B. Bone and soft tissue background

C. Flow information

D. Fat signal

✓ **Answer: B. Bone and soft tissue background**



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- **636. Flat-panel detectors in modern fluoroscopy offer:**
 - A. Lower resolution
 - B. Bulkier design
 - C. Better image quality & compact design
 - D. No dynamic range

✓ **Answer: C. Better image quality & compact design**
- **637. Common fluoroscopy-guided procedures include all EXCEPT:**
 - A. Barium studies
 - B. Cardiac catheterization
 - C. CT perfusion
 - D. Pain injections

✓ **Answer: C. CT perfusion**
- **638. Fluoroscopy time should be:**
 - A. Unlimited
 - B. More than 10 minutes for every procedure
 - C. Kept as short as possible
 - D. Not recorded

✓ **Answer: C. Kept as short as possible**
- **639. To reduce motion blur in fluoroscopy:**
 - A. Increase SID
 - B. Use longer exposure times
 - C. Use high frame rate pulsed fluoroscopy
 - D. Use low kVp

✓ **Answer: C. Use high frame rate pulsed fluoroscopy**
- **640. The most common contrast agent used in fluoroscopy is:**
 - A. Gadolinium
 - B. CO₂
 - C. Iodinated water-soluble contrast
 - D. Air

✓ **Answer: C. Iodinated water-soluble contrast**
- ---

Section C: Radiation Safety in Nuclear Medicine & Fluoroscopy (Q641–650)

- **641. ALARA stands for:**
 - A. As Low As Reasonably Applicable
 - B. As Long As Radiation Allows
 - C. As Light As Radiation Applies



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D. As Low As Reasonably Achievable

✓ **Answer: D. As Low As Reasonably Achievable**

- **642. Which of the following is used for personal radiation monitoring?**

A. Geiger counter

B. Film badge or TLD

C. X-ray film

D. CT detector

✓ **Answer: B. Film badge or TLD**

- **643. Which tissue is most radiosensitive?**

A. Bone

B. Brain

C. Intestinal lining

D. Skin

✓ **Answer: C. Intestinal lining**

- **644. Lead aprons are typically of:**

A. 0.25 mm Pb equivalence

B. 0.5 mm Pb equivalence

C. 2 mm Pb equivalence

D. 5 mm Pb equivalence

✓ **Answer: B. 0.5 mm Pb equivalence**

- **645. The annual occupational dose limit for whole-body exposure is:**

A. 5 mSv

B. 20 mSv

C. 50 mSv

D. 100 mSv

✓ **Answer: C. 50 mSv**

- **646. Time, distance, and shielding are:**

A. Components of contrast protocols

B. Factors in image resolution

C. Principles of radiation protection

D. Artifacts in CT

✓ **Answer: C. Principles of radiation protection**

- **647. Pregnant workers in fluoroscopy should:**

A. Be excluded from all work

B. Have dose monitored and follow protection guidelines

C. Be given contrast to test safety

D. Not wear a dosimeter

✓ **Answer: B. Have dose monitored and follow protection guidelines**



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- **648. The highest radiation dose in fluoroscopy is at:**
 - A. Image intensifier side
 - B. X-ray tube side (entrance skin)
 - C. Table legs
 - D. Ceiling✓ **Answer: B. X-ray tube side (entrance skin)**
 - **649. The most effective method to reduce operator dose in fluoroscopy is:**
 - A. Standing close to tube
 - B. Increasing kVp
 - C. Using proper shielding and distance
 - D. Prolonged exposure✓ **Answer: C. Using proper shielding and distance**
 - **650. Which device instantly detects radioactive contamination?**
 - A. Dosimeter
 - B. CT scanner
 - C. Geiger-Müller counter
 - D. Collimator✓ **Answer: C. Geiger-Müller counter**
-

Section D: Advanced Techniques & Applications

- **651. Which radiotracer is most used in PET for tumor imaging?**
 - A. Tc-99m MDP
 - B. I-131
 - C. F-18 FDG
 - D. Ga-67✓ **Answer: C. F-18 FDG**
- **652. Sentinel lymph node detection uses:**
 - A. Tc-99m sulfur colloid
 - B. I-131
 - C. FDG
 - D. Thallium✓ **Answer: A. Tc-99m sulfur colloid**
- **653. A normal brain FDG-PET shows highest uptake in:**
 - A. Frontal lobes
 - B. Thalamus
 - C. Cortex and basal ganglia



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- D. Cerebellum
✓ **Answer: C. Cortex and basal ganglia**
- **654. Bone scan “hot spots” indicate:**
 - A. Decreased perfusion
 - B. Increased metabolic activity
 - C. Metal artifact
 - D. Artifact from motion✓ **Answer: B. Increased metabolic activity**
- **655. Which scan is used to assess GI bleeding?**
 - A. Renal scan
 - B. Tagged RBC scan
 - C. PET-CT
 - D. DMSA scan✓ **Answer: B. Tagged RBC scan**
- **656. Meckel’s diverticulum is detected using:**
 - A. Tc-99m pertechnetate
 - B. Tc-99m MAA
 - C. I-123
 - D. Ga-68✓ **Answer: A. Tc-99m pertechnetate**
- **657. PET-CT is most useful in:**
 - A. Pneumothorax
 - B. Bone fracture
 - C. Oncology staging
 - D. Renal stone detection✓ **Answer: C. Oncology staging**
- **658. Which organ has the highest background FDG uptake?**
 - A. Kidney
 - B. Spleen
 - C. Brain
 - D. Lung✓ **Answer: C. Brain**
- **659. Gallium scan is mainly used for:**
 - A. Liver function
 - B. Bone mineral content
 - C. Infection and inflammation detection
 - D. Gastric ulcer✓ **Answer: C. Infection and inflammation detection**



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- **660. MUGA scan assesses:**
 - A. Gallbladder function
 - B. Renal perfusion
 - C. Cardiac ejection fraction
 - D. GI bleeding✓ **Answer: C. Cardiac ejection fraction**
- **661. For pulmonary embolism detection, the study is:**
 - A. PET-CT
 - B. V/Q scan
 - C. Bone scan
 - D. CT perfusion✓ **Answer: B. V/Q scan**
- **662. V/Q mismatch on scan suggests:**
 - A. COPD
 - B. Pulmonary embolism
 - C. Pneumonia
 - D. Fibrosis✓ **Answer: B. Pulmonary embolism**
- **663. Thyroid cancer follow-up often uses:**
 - A. Tc-99m
 - B. I-123
 - C. I-131 whole-body scan
 - D. DTPA✓ **Answer: C. I-131 whole-body scan**
- **664. “Star artifact” on nuclear scan indicates:**
 - A. Proper tracer uptake
 - B. Over-concentration of tracer
 - C. Electronic malfunction
 - D. Poor collimation✓ **Answer: B. Over-concentration of tracer**
- **665. Hot spots in bone scan are seen in all EXCEPT:**
 - A. Tumors
 - B. Fractures
 - C. Infection
 - D. Osteoporosis✓ **Answer: D. Osteoporosis**
- **666. Tc-99m labeled macroaggregated albumin (MAA) is used for:**
 - A. Liver scan
 - B. Lung perfusion scan



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- C. Thyroid scan
- D. GI bleed
- ✓ **Answer: B. Lung perfusion scan**
- **667. Salivary gland function can be assessed with:**
 - A. DTPA
 - B. Tc-99m pertechnetate
 - C. FDG
 - D. Sestamibi✓ **Answer: B. Tc-99m pertechnetate**
- **668. Parathyroid adenoma scan uses:**
 - A. Tc-99m MDP
 - B. Tc-99m sestamibi
 - C. FDG
 - D. DTPA✓ **Answer: B. Tc-99m sestamibi**
- **669. Quality control of gamma camera includes:**
 - A. SNR test
 - B. Linearity & uniformity test
 - C. Motion test
 - D. DQE analysis✓ **Answer: B. Linearity & uniformity test**
- **670. The best collimator for small organ imaging is:**
 - A. High-energy parallel-hole
 - B. Pinhole
 - C. Diverging
 - D. Cone-beam✓ **Answer: B. Pinhole**
- **671. PET-CT detects cancer recurrence earlier than:**
 - A. MRI
 - B. USG
 - C. Biopsy
 - D. CT alone✓ **Answer: D. CT alone**
- **672. Fluoroscopy is most commonly used in:**
 - A. MRI
 - B. Interventional radiology



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C. PET

D. CT scan

✓ **Answer: B. Interventional radiology**

- **673. Hepatobiliary scan evaluates:**

A. Renal cortex

B. Myocardial perfusion

C. Gallbladder and bile flow

D. Brain perfusion

✓ **Answer: C. Gallbladder and bile flow**

- **674. High FDG uptake is seen in:**

A. Brain, heart, tumors

B. Bones, lungs

C. Liver, bladder

D. All tissues

✓ **Answer: A. Brain, heart, tumors**

- **675. PET scanner detects:**

A. Single photons

B. Coincident 511 keV gamma photons

C. X-rays

D. Beta particles

✓ **Answer: B. Coincident 511 keV gamma photons**

•

- **Section E: Review, Artifacts & QA**

- **676. Lead apron in fluoroscopy protects against:**

A. Beta rays

B. X-rays

C. Alpha particles

D. Gamma rays

✓ **Answer: B. X-rays**

- **677. Thyroid uptake scan measures:**

A. Tracer dose

B. Thyroid size

C. Functional iodine uptake

D. Hormone levels

✓ **Answer: C. Functional iodine uptake**

- **678. “Photopenic” area on nuclear scan means:**

A. High uptake

B. Motion artifact



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- C. Decreased or no tracer uptake
- D. False positive
- ✓ **Answer: C. Decreased or no tracer uptake**
- **679. The collimator limits:**
 - A. Field of view
 - B. Tracer diffusion
 - C. Angle of gamma ray entry
 - D. Motion artifacts✓ **Answer: C. Angle of gamma ray entry**
- **680. Best practice to reduce dose during fluoroscopy includes:**
 - A. Lower kVp
 - B. Longer exposure
 - C. Using last image hold
 - D. Decreasing filtration✓ **Answer: C. Using last image hold**
- **681. PET scan requires a cyclotron for:**
 - A. Reconstruction
 - B. Image fusion
 - C. Radioisotope production
 - D. Detector calibration✓ **Answer: C. Radioisotope production**
- **682. In a gamma camera, the crystal is typically made of:**
 - A. Sodium chloride
 - B. Cesium iodide
 - C. Thallium-doped sodium iodide
 - D. Lead zirconate✓ **Answer: C. Thallium-doped sodium iodide**
- **683. Which scan is useful in osteomyelitis?**
 - A. Brain perfusion scan
 - B. Bone scan with Tc-99m MDP
 - C. Liver scan
 - D. MUGA scan✓ **Answer: B. Bone scan with Tc-99m MDP**
- **684. PET-CT scan is contraindicated in:**
 - A. Brain tumors
 - B. Pregnancy
 - C. Lymphoma staging
 - D. Fever of unknown origin✓ **Answer: B. Pregnancy**



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- **685. The “last image hold” feature in fluoroscopy helps:**

- A. Store CT images
- B. Reduce radiation exposure
- C. Increase frame rate
- D. Detect metal

✓ **Answer: B. Reduce radiation exposure**

- **686. Gamma ray emission is most suited for:**

- A. Diagnostic imaging
- B. MRI
- C. Biopsy
- D. Echocardiography

✓ **Answer: A. Diagnostic imaging**

- **687. What causes blooming artifact in PET?**

- A. Excess FDG
- B. Incorrect calibration
- C. High FDG uptake
- D. None of the above

✓ **Answer: C. High FDG uptake**

- **688. Radiotracers emit:**

- A. Ultrasound
- B. X-rays
- C. Gamma rays or positrons
- D. Neutrons

✓ **Answer: C. Gamma rays or positrons**

- **689. Most common artifact in SPECT is:**

- A. Ring artifact
- B. Attenuation artifact
- C. Star artifact
- D. Halation

✓ **Answer: B. Attenuation artifact**

- **690. Before FDG-PET scan, the patient must:**

- A. Eat fatty meal
- B. Avoid fasting
- C. Be NPO (fast) for 4–6 hours
- D. Take steroids

✓ **Answer: C. Be NPO (fast) for 4–6 hours**

- **691. Radioactive spill cleanup begins with:**

- A. Mop with water
- B. Call radiation safety officer



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C. Evacuation

D. Reporting to ICRP

✓ **Answer: B. Call radiation safety officer**

- **692. PET-CT is limited in brain due to:**

A. Skull attenuation

B. High background FDG uptake

C. Low scanner resolution

D. Dose issues

✓ **Answer: B. High background FDG uptake**

- **693. Linearity test in gamma cameras evaluates:**

A. Patient table motion

B. Electrical supply

C. Spatial resolution accuracy

D. Gain

✓ **Answer: C. Spatial resolution accuracy**

- **694. The most effective shielding material for gamma rays is:**

A. Wood

B. Lead

C. Glass

D. Plastic

✓ **Answer: B. Lead**

- **695. Radiopharmaceuticals should be stored in:**

A. Plastic drawers

B. Lead-shielded containers

C. Glass jars

D. Wooden boxes

✓ **Answer: B. Lead-shielded containers**

- **696. Highest occupational dose in fluoroscopy is to the:**

A. Neck

B. Eye

C. Thyroid

D. Hands and fingers

✓ **Answer: D. Hands and fingers**

- **697. The scintillation detector converts gamma rays into:**

A. Sound

B. Heat

C. Light photons

D. Neutrons

✓ **Answer: C. Light photons**



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- **698. Which artifact is seen in DSA if the patient moves?**
 - A. Ring artifact
 - B. Motion blur
 - C. Star artifact
 - D. Blooming✓ **Answer: B. Motion blur**
- **699. Which procedure emits the most radiation to the operator?**
 - A. CT
 - B. MRI
 - C. Fluoroscopy
 - D. USG✓ **Answer: C. Fluoroscopy**
- **700. The primary concern in nuclear medicine safety is:**
 - A. Shock
 - B. Gas leak
 - C. Internal contamination and exposure
 - D. Skin burn✓ **Answer: C. Internal contamination and exposure**

Excellent | you have completed 700 mcqs

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Radiographic Quality Assurance & Image Artifacts –

Section A: Radiographic Image Quality Parameters

- **701. The sharpness of a radiographic image is referred to as:**
 - A. Contrast
 - B. Noise
 - C. Spatial resolution
 - D. Distortion✓ **Answer: C. Spatial resolution**



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- **702. High kVp results in:**
 - A. Increased contrast
 - B. Increased patient dose
 - C. Reduced contrast
 - D. Image blurring✓ **Answer: C. Reduced contrast**
- **703. Radiographic contrast is primarily affected by:**
 - A. mA
 - B. Exposure time
 - C. kVp
 - D. SID✓ **Answer: C. kVp**
- **704. Which factor affects image density most directly?**
 - A. Focal spot size
 - B. mAs
 - C. Filtration
 - D. OID✓ **Answer: B. mAs**
- **705. Increased OID results in:**
 - A. Increased magnification
 - B. Better resolution
 - C. Lower contrast
 - D. Decreased patient dose✓ **Answer: A. Increased magnification**
- **706. What is the purpose of a grid in radiography?**
 - A. Reduce noise
 - B. Decrease patient dose
 - C. Absorb scatter radiation
 - D. Improve resolution✓ **Answer: C. Absorb scatter radiation**
- **707. Quantum mottle is caused by:**
 - A. High mAs
 - B. High SID
 - C. Low photon number
 - D. High filtration✓ **Answer: C. Low photon number**
- **708. The visibility of detail depends on:**
 - A. Penumbra
 - B. Grid ratio



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- C. Contrast and noise
- D. kVp alone
- ✓**Answer: C. Contrast and noise**
- **709. SNR stands for:**
 - A. Signal-Noise Ratio
 - B. Signal-Neuron Response
 - C. Sensitivity-Normalization Ratio
 - D. Spectrum-Noise Resolution✓**Answer: A. Signal-Noise Ratio**
- **710. What improves spatial resolution in digital radiography?**
 - A. Larger pixel size
 - B. High mAs
 - C. Small pixel size
 - D. Lower SID✓**Answer: C. Small pixel size**
- **711. Image contrast in CR/DR is primarily controlled by:**
 - A. kVp
 - B. Lookup tables (LUT)
 - C. SID
 - D. Grid type✓**Answer: B. Lookup tables (LUT)**
- **712. Dynamic range refers to:**
 - A. Resolution
 - B. Ability to detect different exposure levels
 - C. Patient dose
 - D. Detector thickness✓**Answer: B. Ability to detect different exposure levels**
- **713. Exposure index (EI) in DR indicates:**
 - A. Patient dose
 - B. Image noise
 - C. Detector response
 - D. Exposure to detector✓**Answer: D. Exposure to detector**
- **714. DQE (Detective Quantum Efficiency) is a measure of:**
 - A. Detector size
 - B. Patient motion
 - C. Detector efficiency
 - D. Radiation output✓**Answer: C. Detector efficiency**



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- **715. In digital radiography, excessive exposure may lead to:**
 - A. Overexposed film
 - B. Detector damage
 - C. Dose creep
 - D. Image distortion

✓ **Answer: C. Dose creep**
- **716. What test evaluates the alignment of X-ray field to light field?**
 - A. Beam alignment test
 - B. Focal spot test
 - C. Collimation test
 - D. Grid test

✓ **Answer: A. Beam alignment test**
- **717. A high contrast resolution phantom is used to assess:**
 - A. mAs
 - B. Low contrast
 - C. Line pair detection
 - D. Motion artifact

✓ **Answer: C. Line pair detection**
- **718. Blooming artifact is most common in:**
 - A. X-ray
 - B. CT
 - C. PET
 - D. Ultrasound

✓ **Answer: C. PET**
- **719. Blurring in images is due to:**
 - A. Short SID
 - B. Fast exposure
 - C. Patient motion
 - D. High contrast

✓ **Answer: C. Patient motion**
- **720. Digital systems have high contrast because of:**
 - A. Algorithm-based processing
 - B. Lower scatter
 - C. Wide exposure latitude
 - D. Larger detector

✓ **Answer: C. Wide exposure latitude**
- **721. Ghost images in CR are due to:**
 - A. Film overexposure
 - B. Faulty grid



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C. Incomplete erasure of IP

D. Underexposure

✓ **Answer: C. Incomplete erasure of IP**

- **722. What can cause a “white line” artifact in CR?**

A. Dust on laser reader

B. Overexposure

C. High kVp

D. Grid failure

✓ **Answer: A. Dust on laser reader**

- **723. Quantum mottle appears as:**

A. Grainy, mottled image

B. Uniform white image

C. Blurry edge

D. Linear bands

✓ **Answer: A. Grainy, mottled image**

- **724. Improper alignment of AEC detectors leads to:**

A. Reduced contrast

B. Over- or underexposure

C. Motion blur

D. Ghost artifact

✓ **Answer: B. Over- or underexposure**

- **725. What artifact arises from grid cutoff?**

A. White streak

B. Uneven density

C. Ring artifact

D. Star artifact

✓ **Answer: B. Uneven density**

- **Section B: QA Equipment Tests**

- **726. The Half-Value Layer (HVL) test evaluates:**

A. Beam collimation

B. Exposure time accuracy

C. Beam quality (penetrability)

D. Spatial resolution

✓ **Answer: C. Beam quality (penetrability)**

- **727. The light field-radiation field congruence should be within:**

A. 1 mm

B. 2 mm



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C. $\pm 2\%$ of SID

D. $\pm 10\%$ of SID

✓ **Answer: C. $\pm 2\%$ of SID**

- **728. Timer accuracy in X-ray units is checked using:**

A. Aluminum step wedge

B. Oscilloscope

C. Spinning top test

D. Collimator

✓ **Answer: C. Spinning top test**

- **729. The focal spot size is evaluated with:**

A. Pinhole camera or star pattern

B. Step wedge

C. AEC phantom

D. Beam alignment tool

✓ **Answer: A. Pinhole camera or star pattern**

- **730. Which test is used to assess AEC consistency?**

A. mAs linearity test

B. Exposure reproducibility test

C. Resolution test

D. HVL test

✓ **Answer: B. Exposure reproducibility test**

- **731. The acceptable limit for reproducibility variation in AEC is:**

A. $\pm 5\%$

B. $\pm 10\%$

C. $\pm 15\%$

D. $\pm 20\%$

✓ **Answer: B. $\pm 10\%$**

- **732. Linearity of mAs output should vary by no more than:**

A. 2%

B. 5%

C. 10%

D. 20%

✓ **Answer: C. 10%**

- **733. Beam collimation accuracy is checked using a:**

A. Line pair phantom

B. Collimator template

C. Pinhole camera

D. Step wedge

✓ **Answer: B. Collimator template**



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- **734. What tool is used to test screen-film contact?**
 - A. Wire mesh test tool
 - B. Star phantom
 - C. DQE phantom
 - D. Laser alignment tool

✓ **Answer: A. Wire mesh test tool**
- **735. Which device checks fluoroscopy timer accuracy?**
 - A. Stopwatch
 - B. Ionization chamber
 - C. Dosimeter
 - D. TLD

✓ **Answer: A. Stopwatch**

-
- **Section C: Common CT Artifacts**
 - **736. The “cupping” artifact in CT is caused by:**
 - A. Beam hardening
 - B. Motion
 - C. Contrast
 - D. Detector failure

✓ **Answer: A. Beam hardening**
 - **737. The “ring artifact” in CT is usually due to:**
 - A. Contrast leakage
 - B. Miscalibrated or defective detector
 - C. Misalignment
 - D. Tube arcing

✓ **Answer: B. Miscalibrated or defective detector**
 - **738. “Windmill” artifact is caused by:**
 - A. High pitch in helical CT
 - B. Scatter
 - C. Low kVp
 - D. Wide windowing

✓ **Answer: A. High pitch in helical CT**
 - **739. Streak artifacts commonly occur with:**
 - A. Water
 - B. Bone and metal implants
 - C. Soft tissues
 - D. Gas

✓ **Answer: B. Bone and metal implants**



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- **740. The best method to reduce metal artifacts in CT is:**
 - A. Increase kVp
 - B. Decrease pitch
 - C. Use metal artifact reduction software
 - D. Use non-helical scan

✓ **Answer: C. Use metal artifact reduction software**
- ---
- **Section D: Common MRI Artifacts**
- **741. Motion artifact in MRI appears as:**
 - A. Blurred edges
 - B. Parallel ghost lines
 - C. Ring distortion
 - D. Signal dropout

✓ **Answer: B. Parallel ghost lines**
- **742. Magnetic susceptibility artifact is most commonly seen near:**
 - A. Blood vessels
 - B. Implants or air-tissue interfaces
 - C. Fat
 - D. Muscle

✓ **Answer: B. Implants or air-tissue interfaces**
- **743. Chemical shift artifact appears at:**
 - A. Bone interfaces
 - B. Fat–water boundaries
 - C. Skull base
 - D. Thoracic cavity

✓ **Answer: B. Fat–water boundaries**
- **744. Truncation artifact is also called:**
 - A. Gibbs artifact
 - B. Moiré pattern
 - C. Blooming
 - D. Ring artifact

✓ **Answer: A. Gibbs artifact**
- **745. To reduce aliasing in MRI, one should:**
 - A. Increase matrix size
 - B. Use a thicker slice



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C. Increase field of view

D. Use lower TR

✓ **Answer: C. Increase field of view**

- **Section E: USG & General Artifacts**

- **746. Acoustic shadowing occurs when:**

A. Sound waves bounce back

B. Sound is completely reflected

C. There is strong absorption or reflection

D. Gain is high

✓ **Answer: C. There is strong absorption or reflection**

- **747. Posterior acoustic enhancement is seen behind:**

A. Bone

B. Cystic structures

C. Air

D. Metal

✓ **Answer: B. Cystic structures**

- **748. Reverberation artifact appears as:**

A. Signal dropout

B. Mirror image duplication

C. Multiple linear echoes

D. Curved distortion

✓ **Answer: C. Multiple linear echoes**

- **749. Mirror image artifact is commonly seen near the:**

A. Aorta

B. Diaphragm

C. Kidney

D. Thyroid

✓ **Answer: B. Diaphragm**

- **750. Aliasing in Doppler occurs due to:**

A. High-frequency transducer

B. Exceeding Nyquist limit

C. Low pulse repetition

D. Contrast agent

✓ **Answer: B. Exceeding Nyquist limit**

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Radiographic Quality Assurance & Image Artifacts –

- **Section A: Advanced QA and Testing**
- **751. Linearity in X-ray output means:**
 - A. Constant dose over time
 - B. Doubling mAs doubles output
 - C. Equal contrast at all kVp
 - D. Constant image density

✓Answer: B. Doubling mAs doubles output
- **752. X-ray beam alignment must be checked regularly because:**
 - A. It affects collimation only
 - B. It affects only DR systems
 - C. Misalignment can cause patient overexposure
 - D. It's optional

✓Answer: C. Misalignment can cause patient overexposure
- **753. Kilovoltage accuracy is tested using a:**
 - A. Densitometer
 - B. kVp meter
 - C. Step wedge
 - D. Phantom

✓Answer: B. kVp meter
- **754. Poor screen-film contact results in:**
 - A. Increased contrast
 - B. Blurry images
 - C. Increased noise
 - D. Low density

✓Answer: B. Blurry images
- **755. A wire mesh test evaluates:**
 - A. kVp accuracy
 - B. Detector efficiency
 - C. Screen-film contact
 - D. Filtration

✓Answer: C. Screen-film contact



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- **756. Film fog is mainly caused by:**
 - A. Overexposure
 - B. Light leaks
 - C. Underdevelopment
 - D. Low mAs

✓Answer: B. Light leaks
- **757. Processor roller marks appear as:**
 - A. Black horizontal lines
 - B. Grid lines
 - C. Fine scratches or bands
 - D. White vertical streaks

✓Answer: C. Fine scratches or bands
- **758. What is used to monitor processor temperature?**
 - A. Thermostat
 - B. Step wedge
 - C. Timer
 - D. Timer chart

✓Answer: A. Thermostat
- **759. Sensitometry evaluates:**
 - A. X-ray filtration
 - B. Processing quality
 - C. Patient dose
 - D. Noise

✓Answer: B. Processing quality
- **760. Film speed and contrast are assessed using a:**
 - A. Densitometer
 - B. Stopwatch
 - C. Thermometer
 - D. TLD

✓Answer: A. Densitometer
- **761. The base fog level should be below:**
 - A. 0.10
 - B. 0.15
 - C. 0.20
 - D. 0.30 optical density

✓Answer: C. 0.20 optical density
- **762. Developer solution should be changed when:**
 - A. Daily
 - B. Weekly



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- C. Chemical activity drops or changes color
- D. Film looks dark
- ✓ **Answer: C. Chemical activity drops or changes color**
- **763. The fixer removes:**
 - A. Unexposed silver halide
 - B. Fog
 - C. Developer solution
 - D. Glare✓ **Answer: A. Unexposed silver halide**
- **764. The step wedge test measures:**
 - A. HVL
 - B. Contrast (film characteristic curve)
 - C. Scatter radiation
 - D. Exposure time✓ **Answer: B. Contrast (film characteristic curve)**
- **765. Speed index deviation should not exceed:**
 - A. ± 0.10
 - B. ± 0.20
 - C. ± 0.30
 - D. ± 0.50✓ **Answer: C. ± 0.30**
- **766. For proper developer function, the temperature should be:**
 - A. 10–15°C
 - B. 20–22°C
 - C. 32–35°C
 - D. 40–45°C✓ **Answer: C. 32–35°C**
- **767. A test for automatic exposure control (AEC) performance is the:**
 - A. Linearity test
 - B. Step wedge
 - C. Aluminum slab reproducibility test
 - D. Sensitometry curve✓ **Answer: C. Aluminum slab reproducibility test**
- **768. Low optical density in sensitometry indicates:**
 - A. Overdevelopment
 - B. Weak developer
 - C. High kVp
 - D. Dirty rollers✓ **Answer: B. Weak developer**



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- **769. A daily quality control test includes:**
 - A. Timer calibration
 - B. DQE test
 - C. Processor sensitometry
 - D. HVL measurement

✓ **Answer: C. Processor sensitometry**
- **770. The fixer is monitored using:**
 - A. Aluminum step wedge
 - B. Clearing time test
 - C. Beam alignment
 - D. Densitometer

✓ **Answer: B. Clearing time test**
- ---
- **Section B: Review of Artifacts Across Modalities**
- **771. In DR, a dead pixel appears as:**
 - A. Black or white dot
 - B. Blurry region
 - C. Grid line
 - D. Blooming edge

✓ **Answer: A. Black or white dot**
- **772. Lag artifact is due to:**
 - A. Delay in erasure
 - B. Insufficient exposure
 - C. Defective AEC
 - D. High SID

✓ **Answer: A. Delay in erasure**
- **773. A Moiré pattern in CR/DR is caused by:**
 - A. Grid lines and scanner alignment
 - B. Air artifact
 - C. Reversed cassette
 - D. Scatter

✓ **Answer: A. Grid lines and scanner alignment**
- **774. Ring artifact in CT is from:**
 - A. Filter issue
 - B. Miscalibrated detector
 - C. Overrotation
 - D. Tilted gantry

✓ **Answer: B. Miscalibrated detector**



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- **775. Truncation artifacts in MRI result from:**
 - A. Short scan time
 - B. Undersampling
 - C. Oversaturation
 - D. Long TE

✓ **Answer: B. Undersampling**
- **776. Partial volume effect is due to:**
 - A. Slow scan speed
 - B. Mixing of tissues within a voxel
 - C. High kVp
 - D. Beam hardening

✓ **Answer: B. Mixing of tissues within a voxel**
- **777. Ghosting in MRI may indicate:**
 - A. Motion
 - B. High bandwidth
 - C. Overexposure
 - D. Poor shielding

✓ **Answer: A. Motion**
- **778. Image blurring from long exposure can be corrected by:**
 - A. Lower SID
 - B. Using AEC
 - C. Shorter exposure time
 - D. Thicker grid

✓ **Answer: C. Shorter exposure time**
- **779. Overexposed DR image can appear normal due to:**
 - A. Windowing
 - B. Collimation
 - C. Dose creep and LUT adjustments
 - D. Lower kVp

✓ **Answer: C. Dose creep and LUT adjustments**
- **780. Dark line artifact in CR typically results from:**
 - A. Laser scanning defect
 - B. Developer streak
 - C. Collimator fault
 - D. Tube misalignment

✓ **Answer: A. Laser scanning defect**
- **781. Double exposure artifact appears as:**
 - A. Duplicate images
 - B. Dense area



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- C. Ghost shadows
- D. White lines
- ✓**Answer: A. Duplicate images**
- **782. Noise in DR is minimized by:**
 - A. Lowering mAs
 - B. Increasing exposure
 - C. Reducing distance
 - D. Increasing kVp✓**Answer: B. Increasing exposure**
- **783. Dropout artifact in ultrasound is caused by:**
 - A. Fluid
 - B. Bone
 - C. Shadowing
 - D. None of the above✓**Answer: C. Shadowing**
- **784. Gibbs (truncation) artifact is resolved by:**
 - A. Increasing matrix size
 - B. Lowering FOV
 - C. Reducing slice thickness
 - D. Using high TR✓**Answer: A. Increasing matrix size**
- **785. Which modality is most sensitive to metal artifacts?**
 - A. USG
 - B. MRI
 - C. CT
 - D. Radiography✓**Answer: C. CT**
- **786. Phase wrap artifact in MRI is reduced by:**
 - A. Enlarging FOV
 - B. Short TE
 - C. Using more slices
 - D. High flip angle✓**Answer: A. Enlarging FOV**
- **787. Cone beam CT (CBCT) artifacts increase with:**
 - A. Low resolution
 - B. Wide beam angle
 - C. Detector size
 - D. Fast scan✓**Answer: B. Wide beam angle**



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- **788. High Z materials cause which artifact?**

- A. Streak artifact
- B. Gibbs artifact
- C. Aliasing
- D. Wrap-around

✓ **Answer: A. Streak artifact**

- **789. Film fog may result from:**

- A. Storage near heat
- B. Proper drying
- C. High kVp
- D. Short exposure

✓ **Answer: A. Storage near heat**

- **790. CT artifact from movement is called:**

- A. Ring
- B. Motion
- C. Truncation
- D. Beam hardening

✓ **Answer: B. Motion**

-

- **Section C: QA Schedules & Standards**

- **791. Preventive maintenance is scheduled:**

- A. When equipment fails
- B. Monthly or quarterly
- C. Annually
- D. Randomly

✓ **Answer: B. Monthly or quarterly**

- **792. Acceptance testing is done:**

- A. Before repair
- B. After breakdown
- C. Before clinical use
- D. During patient scan

✓ **Answer: C. Before clinical use**

- **793. A test phantom is used for:**

- A. Real patients
- B. Detector repair
- C. Quality control tests
- D. Electromagnetic testing

✓ **Answer: C. Quality control tests**



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- **794. Annual QA includes:**
 - A. Checking power switch
 - B. Timer reproducibility
 - C. mAs linearity & focal spot size test
 - D. TLD monitoring

✓ **Answer: C. mAs linearity & focal spot size test**
- **795. A CR reader erasure test checks for:**
 - A. Tube warmup
 - B. Ghost images
 - C. Filtration
 - D. Output dose

✓ **Answer: B. Ghost images**
- **796. TLDs are worn:**
 - A. On feet
 - B. Inside lead apron
 - C. On collar outside lead apron
 - D. At wrist

✓ **Answer: C. On collar outside lead apron**
- **797. Star test pattern is used for:**
 - A. kVp linearity
 - B. Spatial resolution of focal spot
 - C. Timer accuracy
 - D. Beam alignment

✓ **Answer: B. Spatial resolution of focal spot**
- **798. For CR cassette quality control:**
 - A. Open and clean daily
 - B. Check image plate for scratches
 - C. Replace weekly
 - D. Disinfect with alcohol

✓ **Answer: B. Check image plate for scratches**
- **799. A digital detector's calibration ensures:**
 - A. Tube temperature
 - B. Patient safety
 - C. Uniform pixel response
 - D. Film resolution

✓ **Answer: C. Uniform pixel response**
- **800. National QA guidelines are issued by:**
 - A. FDA
 - B. BIS or AERB (India) / NCRP (USA)



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C. WHO

D. Local vendor

✓ **Answer: B. BIS or AERB (India) / NCRP (USA)**

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- ☐ Congratulations! You've completed Q800.
- ---

Radiation Biology & Radiotherapy Techniques –

- ---
- **Section A: Radiation Biology Fundamentals**
- **801. The unit of radiation absorbed dose is:**
 - A. Sievert (Sv)
 - B. Gray (Gy)
 - C. Becquerel (Bq)
 - D. Roentgen✓ **Answer: B. Gray (Gy)**
- **802. Which type of radiation is most ionizing but least penetrating?**
 - A. X-rays
 - B. Gamma rays
 - C. Beta particles
 - D. Alpha particles✓ **Answer: D. Alpha particles**
- **803. The most radiosensitive phase of the cell cycle is:**
 - A. G1 phase
 - B. S phase
 - C. G2-M phase
 - D. Resting phase✓ **Answer: C. G2-M phase**
- **804. Direct action of radiation involves:**
 - A. DNA damage via free radicals
 - B. Direct hit on DNA or RNA



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C. Interaction with water

D. Ionization of oxygen

✓ **Answer: B. Direct hit on DNA or RNA**

- **805. Indirect action of radiation primarily occurs via:**

A. DNA strands breaking

B. Free radicals from water

C. Energy loss to air

D. Mitochondrial damage

✓ **Answer: B. Free radicals from water**

- **806. Which is the most radiosensitive organ?**

A. Heart

B. Liver

C. Bone marrow

D. Kidney

✓ **Answer: C. Bone marrow**

- **807. The law of Bergonie and Tribondeau states that:**

A. Radiosensitivity is inversely related to metabolic activity

B. Mature cells are more radiosensitive

C. Radiosensitivity increases with cell division

D. Radiation damages proteins

✓ **Answer: C. Radiosensitivity increases with cell division**

- **808. Deterministic effects of radiation have:**

A. No threshold

B. Random occurrence

C. Severity increases with dose

D. Only genetic basis

✓ **Answer: C. Severity increases with dose**

- **809. Stochastic effects differ because:**

A. They are dose-dependent

B. They have a threshold

C. Probability increases with dose

D. Always occur immediately

✓ **Answer: C. Probability increases with dose**

- **810. Which tissue is LEAST radiosensitive?**

A. Testes

B. Skin

C. Muscle

D. Bone marrow

✓ **Answer: C. Muscle**



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- **811. LET (Linear Energy Transfer) refers to:**
 - A. Dose delivered over time
 - B. Radiation travel distance
 - C. Energy deposited per unit track length
 - D. Penetrability of radiation

✓ **Answer: C. Energy deposited per unit track length**
- **812. Which has the highest LET?**
 - A. X-rays
 - B. Gamma rays
 - C. Alpha particles
 - D. Neutrons

✓ **Answer: C. Alpha particles**
- **813. Which organ shows late radiation effects?**
 - A. Liver
 - B. Skin
 - C. Lung
 - D. Bone

✓ **Answer: C. Lung**
- **814. Which radiation syndrome occurs after 1–2 Gy whole-body exposure?**
 - A. Hematopoietic
 - B. CNS
 - C. GI
 - D. Skin

✓ **Answer: A. Hematopoietic**
- **815. LD50/60 refers to:**
 - A. Dose that kills 50% in 60 seconds
 - B. Dose lethal to 50% in 60 days
 - C. Half of maximum dose
 - D. None

✓ **Answer: B. Dose lethal to 50% in 60 days**
- **816. What increases radiosensitivity?**
 - A. Low oxygen
 - B. High oxygen (OER effect)
 - C. Acidic pH
 - D. Dehydration

✓ **Answer: B. High oxygen (OER effect)**
- **817. DNA double-strand breaks are most commonly caused by:**
 - A. Low LET
 - B. Free radicals



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C. High LET radiation

D. Protein synthesis

✓**Answer: C. High LET radiation**

- **818. A high dose rate in radiation therapy causes:**

A. Less biological damage

B. Same damage

C. More biological damage

D. No effect

✓**Answer: C. More biological damage**

- **819. RBE (Relative Biological Effectiveness) is high for:**

A. X-rays

B. Alpha particles

C. Electrons

D. Gamma rays

✓**Answer: B. Alpha particles**

- **820. The most sensitive structure in the eye to radiation is:**

A. Cornea

B. Lens

C. Retina

D. Optic nerve

✓**Answer: B. Lens**

- **821. Cataract formation is a:**

A. Stochastic effect

B. Deterministic effect

C. Genetic effect

D. Chronic effect only

✓**Answer: B. Deterministic effect**

- **822. Which radiation effect is heritable?**

A. Carcinogenesis

B. Acute dermatitis

C. Genetic mutations

D. Cataract

✓**Answer: C. Genetic mutations**

- **823. A lethal dose of whole-body radiation (>10 Gy) causes:**

A. Mild erythema

B. CNS syndrome

C. No effect

D. Skin burn only

✓**Answer: B. CNS syndrome**



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- **824. The threshold dose for temporary sterility in males is:**

A. 0.5 Gy
B. 1 Gy
C. 2.5 Gy
D. 5 Gy

✓ **Answer: C. 2.5 Gy**

- **825. Chronic low-dose radiation increases risk of:**

A. Erythema
B. Burns
C. Genetic mutations and cancer
D. None

✓ **Answer: C. Genetic mutations and cancer**

-

- **Section B: Radiotherapy Equipment & Techniques**

- **826. The main source in a Cobalt-60 unit is:**

A. Cesium-137
B. Iridium-192
C. Cobalt-60
D. Radium-226

✓ **Answer: C. Cobalt-60**

- **827. Energy emitted by Cobalt-60 is approximately:**

A. 0.5 MeV
B. 1.17 and 1.33 MeV
C. 2.4 MeV
D. 6 MV

✓ **Answer: B. 1.17 and 1.33 MeV**

- **828. Linear accelerators produce:**

A. Gamma rays
B. Beta particles
C. High energy X-rays and electrons
D. Neutrons

✓ **Answer: C. High energy X-rays and electrons**

- **829. Electron beams in radiotherapy are used mainly for:**

A. Deep tumors
B. Bone lesions
C. Superficial tumors
D. Brain tumors

✓ **Answer: C. Superficial tumors**



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- **830. The unit of radiation dose used in treatment planning is:**
 - A. Sievert
 - B. Roentgen
 - C. Gray (Gy)
 - D. REM✓ **Answer: C. Gray (Gy)**
- **831. Brachytherapy involves:**
 - A. Use of external beams only
 - B. Radioactive sources placed inside or close to the tumor
 - C. MRI-based radiotherapy
 - D. X-ray fluoroscopy✓ **Answer: B. Radioactive sources placed inside or close to the tumor**
- **832. HDR in brachytherapy stands for:**
 - A. High Dose Reduction
 - B. High Dose Rate
 - C. High Dynamic Range
 - D. High Density Radiation✓ **Answer: B. High Dose Rate**
- **833. Commonly used source in HDR brachytherapy is:**
 - A. Iodine-125
 - B. Cobalt-60
 - C. Iridium-192
 - D. Technetium-99m✓ **Answer: C. Iridium-192**
- **834. The inverse square law applies to:**
 - A. MRI
 - B. Ultrasound
 - C. Radiation intensity vs. distance
 - D. Chemical exposure✓ **Answer: C. Radiation intensity vs. distance**
- **835. The source-to-surface distance (SSD) is important in:**
 - A. MRI
 - B. Brachytherapy
 - C. Teletherapy planning
 - D. PET✓ **Answer: C. Teletherapy planning**
- ---



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- **Section C: Dose Planning and Fractionation**
- **836. Fractionation in radiotherapy means:**
 - A. Delivering one large dose
 - B. Splitting total dose into multiple sessions
 - C. Using different beam energies
 - D. Continuous low dose

✓ **Answer: B. Splitting total dose into multiple sessions**
- **837. The most common fractionation schedule is:**
 - A. Once per week
 - B. Twice per day
 - C. 2 Gy per day, 5 days a week
 - D. 1 Gy per hour

✓ **Answer: C. 2 Gy per day, 5 days a week**
- **838. Hyperfractionation involves:**
 - A. Fewer, larger doses
 - B. Two smaller doses per day
 - C. One dose weekly
 - D. Brachytherapy only

✓ **Answer: B. Two smaller doses per day**
- **839. The tolerance dose for spinal cord is approximately:**
 - A. 10 Gy
 - B. 20 Gy
 - C. 45–50 Gy
 - D. 70 Gy

✓ **Answer: C. 45–50 Gy**
- **840. A common unit for biologically effective dose (BED) calculation is:**
 - A. Sv
 - B. cGy
 - C. EQD2
 - D. REM

✓ **Answer: C. EQD2**
- **841. The 4 R's of radiobiology are:**
 - A. Repair, Redistribution, Reoxygenation, Repopulation
 - B. Reduce, Reuse, Recycle, Replenish
 - C. Radiate, Remove, Replace, Reflect
 - D. Reaction, Resistance, Response, Rebound

✓ **Answer: A. Repair, Redistribution, Reoxygenation, Repopulation**
- **842. What is radiosensitizer?**
 - A. Drug reducing tissue sensitivity



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B. Drug enhancing radiation effect

C. Immune stimulant

D. Chemotherapy blocker

✓ **Answer: B. Drug enhancing radiation effect**

- **843. Which of the following is a common radiosensitizer?**

A. Metformin

B. Temozolomide

C. Cisplatin

D. Atorvastatin

✓ **Answer: C. Cisplatin**

- **844. The dose limiting organ in pelvic radiation is typically:**

A. Brain

B. Lung

C. Small bowel

D. Femur

✓ **Answer: C. Small bowel**

- **845. IMRT allows:**

A. Random dose delivery

B. Uniform dose to all tissues

C. Conformal dose with intensity modulation

D. MRI guidance only

✓ **Answer: C. Conformal dose with intensity modulation**

-
- **Section D: Modern Radiotherapy Techniques**

- **846. IGRT stands for:**

A. Internal Guided RT

B. Intensity Gradient RT

C. Image Guided Radiotherapy

D. Isotope Guided RT

✓ **Answer: C. Image Guided Radiotherapy**

- **847. SBRT is best defined as:**

A. Single beam rotation

B. Stereotactic body radiotherapy

C. Sequential brain therapy

D. Soft beam rotational therapy

✓ **Answer: B. Stereotactic body radiotherapy**

- **848. SRS (Stereotactic Radiosurgery) is mainly used for:**

A. Lung tumors



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- B. Brain tumors and AVMs
 - C. Breast cancer
 - D. GI tumors
 - ✓ **Answer: B. Brain tumors and AVMs**
 - **849. The main advantage of proton therapy is:**
 - A. Cheaper cost
 - B. Higher SNR
 - C. Bragg peak sparing healthy tissue
 - D. Lower equipment size✓ **Answer: C. Bragg peak sparing healthy tissue**
 - **850. A multileaf collimator (MLC) is used to:**
 - A. Increase mA
 - B. Control tumor metabolism
 - C. Shape the beam in IMRT
 - D. Deliver chemotherapy✓ **Answer: C. Shape the beam in IMRT**
 -
-

Radiation Biology & Radiotherapy Techniques –

- **Section A: Radiation Dose Limits & Protection**
- **851. Annual dose limit for radiation workers (whole body) is:**
 - A. 10 mSv
 - B. 20 mSv
 - C. 50 mSv
 - D. 100 mSv✓ **Answer: C. 50 mSv**
- **852. Annual dose limit for the general public is:**
 - A. 0.5 mSv
 - B. 1 mSv
 - C. 5 mSv
 - D. 10 mSv✓ **Answer: B. 1 mSv**



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- **853. Pregnant radiation workers have a fetal dose limit of:**
 - A. 1 mSv
 - B. 5 mSv
 - C. 0.5 mSv/month
 - D. 50 mSv✓ **Answer: C. 0.5 mSv/month**
- **854. Which protective device is most effective in shielding from X-rays?**
 - A. Lead apron
 - B. Thyroid collar
 - C. Glass barrier
 - D. All of the above✓ **Answer: D. All of the above**
- **855. The primary barrier in an X-ray room protects against:**
 - A. Scatter radiation
 - B. Direct radiation beam
 - C. Background radiation
 - D. Leakage✓ **Answer: B. Direct radiation beam**
- **856. Leakage radiation from X-ray tube housing must not exceed:**
 - A. 0.1 mGy/hr
 - B. 1 mGy/hr
 - C. 1 mGy/min
 - D. 0.5 mGy/min✓ **Answer: B. 1 mGy/hr**
- **857. TLD badges measure:**
 - A. Real-time exposure
 - B. Accumulated radiation dose
 - C. Only alpha exposure
 - D. Beta contamination✓ **Answer: B. Accumulated radiation dose**
- **858. The radiation weighting factor for X-rays is:**
 - A. 1
 - B. 2
 - C. 5
 - D. 10✓ **Answer: A. 1**
- **859. Which is most sensitive dosimeter?**
 - A. Film badge
 - B. TLD



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- C. Pocket dosimeter
- D. OSL (Optically Stimulated Luminescence)

✓ **Answer: D. OSL**

- **860. ALARA principle stands for:**

- A. Allow Low Activity Radiation Area
- B. As Low As Reasonably Achievable
- C. As Low As Required Always
- D. Automatic Linear Absorber Reduction

✓ **Answer: B. As Low As Reasonably Achievable**

- **861. Distance is a key factor in radiation protection because of:**

- A. Beam hardening
- B. Scatter shielding
- C. Inverse square law
- D. Light field overlap

✓ **Answer: C. Inverse square law**

- **862. Which of the following provides time-integrated exposure monitoring?**

- A. Real-time monitor
- B. TLD badge
- C. Portal dosimetry
- D. Radiation survey meter

✓ **Answer: B. TLD badge**

- **863. What is the minimum thickness of lead apron recommended for 100 kVp?**

- A. 0.1 mm
- B. 0.25 mm
- C. 0.5 mm
- D. 1.0 mm

✓ **Answer: C. 0.5 mm**

- **864. What material is used in TLD badges?**

- A. Lithium fluoride
- B. Cesium iodide
- C. Sodium chloride
- D. Calcium carbonate

✓ **Answer: A. Lithium fluoride**

- **865. The organ with the highest radiation dose in pelvic radiotherapy is usually:**

- A. Spinal cord
- B. Rectum
- C. Femur
- D. Stomach

✓ **Answer: B. Rectum**



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- **866. Which one is considered a controlled area in radiation safety?**
 - A. General waiting area
 - B. Public restroom
 - C. CT scan control room
 - D. Radiotherapy treatment room

✓ **Answer: D. Radiotherapy treatment room**
 - **867. Personnel monitoring must be done:**
 - A. Annually
 - B. Every 3 months
 - C. Monthly or bi-monthly
 - D. Weekly

✓ **Answer: C. Monthly or bi-monthly**
 - **868. Eye lens radiation limit for workers (as per ICRP 2011) is:**
 - A. 150 mSv/year
 - B. 50 mSv/year
 - C. 20 mSv/year averaged over 5 years
 - D. 10 mSv/year

✓ **Answer: C. 20 mSv/year averaged over 5 years**
 - **869. Which is the most radiosensitive period during pregnancy?**
 - A. 0–2 weeks
 - B. 2–8 weeks
 - C. 12–20 weeks
 - D. After 20 weeks

✓ **Answer: B. 2–8 weeks**
 - **870. The best way to reduce patient dose is to:**
 - A. Increase kVp
 - B. Use high mAs
 - C. Use collimation and proper technique
 - D. Stand farther from patient

✓ **Answer: C. Use collimation and proper technique**
-

- **Section B: Radiotherapy QA, Review & Advanced Concepts**
- **871. QA in radiotherapy ensures:**
 - A. Maximum dose delivery
 - B. Accurate and safe patient treatment
 - C. Faster machine output
 - D. Reduced staffing

✓ **Answer: B. Accurate and safe patient treatment**



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- **872. Beam flatness and symmetry are tested:**
 - A. Daily
 - B. Weekly
 - C. Monthly
 - D. Annually

✓ **Answer: C. Monthly**
- **873. What is used to verify the actual delivered dose in radiotherapy?**
 - A. kVp meter
 - B. Densitometer
 - C. Dosimeter (ion chamber or diode)
 - D. TLD badge

✓ **Answer: C. Dosimeter (ion chamber or diode)**
- **874. Portal imaging is used to:**
 - A. Verify treatment field alignment
 - B. Check patient ID
 - C. Reduce dose
 - D. Treat superficial lesions

✓ **Answer: A. Verify treatment field alignment**
- **875. The water phantom is used to measure:**
 - A. Patient temperature
 - B. Beam energy characteristics
 - C. Noise
 - D. Photon scatter

✓ **Answer: B. Beam energy characteristics**
- **876. Which phantom is used in CT QA?**
 - A. Water phantom
 - B. ACR phantom
 - C. Anthropomorphic phantom
 - D. Film phantom

✓ **Answer: B. ACR phantom**
- **877. RTOG protocols are related to:**
 - A. CT imaging
 - B. USG evaluation
 - C. Radiotherapy trials and QA
 - D. Digital subtraction angiography

✓ **Answer: C. Radiotherapy trials and QA**
- **878. Immobilization devices in radiotherapy are used to:**
 - A. Enhance imaging contrast
 - B. Protect staff



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- C. Maintain consistent patient positioning
- D. Monitor blood pressure
- ✓ **Answer: C. Maintain consistent patient positioning**
- **879. GTV in radiotherapy planning stands for:**
 - A. Gross Tumor Volume
 - B. General Treatment Volume
 - C. Generic Target Vector
 - D. Guided Treatment Value✓ **Answer: A. Gross Tumor Volume**
- **880. CTV refers to:**
 - A. Clinical Television
 - B. Combined Tumor Value
 - C. Clinical Target Volume
 - D. Calibrated Therapy Volume✓ **Answer: C. Clinical Target Volume**
- **881. PTV accounts for:**
 - A. Patient tolerance volume
 - B. Planning target volume with setup margins
 - C. Photon transfer variation
 - D. Peak therapeutic volume✓ **Answer: B. Planning target volume with setup margins**
- **882. The most conformal external radiotherapy technique is:**
 - A. 2D RT
 - B. 3D-CRT
 - C. IMRT
 - D. Conventional X-ray✓ **Answer: C. IMRT**
- **883. QA documentation in radiotherapy should be maintained for:**
 - A. 1 year
 - B. 5 years
 - C. 10 years or as per regulatory authority
 - D. No documentation required✓ **Answer: C. 10 years or as per regulatory authority**
- **884. Most radiosensitive blood cell line is:**
 - A. Neutrophils
 - B. Platelets
 - C. Lymphocytes
 - D. Monocytes✓ **Answer: C. Lymphocytes**



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- **885. Beam energy is checked using:**
 - A. Depth dose curves
 - B. Pixel value
 - C. mAs chart
 - D. TLD badge✓ **Answer: A. Depth dose curves**
- **886. Teletherapy QA includes checking:**
 - A. Light field and radiation field congruence
 - B. Gantry angle only
 - C. kVp selection
 - D. DICOM export✓ **Answer: A. Light field and radiation field congruence**
- **887. Radiation-induced fibrosis is considered a:**
 - A. Late effect
 - B. Early effect
 - C. Genetic effect
 - D. Stochastic effect✓ **Answer: A. Late effect**
- **888. Common location of osteoradionecrosis is:**
 - A. Skull
 - B. Femur
 - C. Mandible
 - D. Spine✓ **Answer: C. Mandible**
- **889. Most radiation-resistant tissue is:**
 - A. Bone marrow
 - B. Liver
 - C. Nervous tissue
 - D. Mucosa✓ **Answer: C. Nervous tissue**
- **890. Most common side effect of radiotherapy in head & neck is:**
 - A. Diarrhea
 - B. Vomiting
 - C. Mucositis
 - D. Alopecia✓ **Answer: C. Mucositis**
- **891. 3D-CRT differs from 2D RT in:**
 - A. Source used
 - B. Imaging guidance



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- C. Beam shaping to match tumor
- D. Dose calculation only
- ✓ **Answer: C. Beam shaping to match tumor**
- **892. Bystander effect refers to:**
 - A. Observer dose
 - B. Effects seen in non-irradiated neighboring cells
 - C. Scatter radiation
 - D. Operator monitoring✓ **Answer: B. Effects seen in non-irradiated neighboring cells**
- **893. Main advantage of hypofractionation:**
 - A. Increases treatment time
 - B. Reduces normal tissue damage
 - C. Decreases total dose
 - D. More convenience for patient✓ **Answer: D. More convenience for patient**
- **894. NCRP stands for:**
 - A. National Clinical Radiation Protocol
 - B. National Council on Radiation Protection and Measurements
 - C. Nuclear Core Radiation Protocol
 - D. None of the above✓ **Answer: B. National Council on Radiation Protection and Measurements**
- **895. Radiotherapy QA in India is monitored by:**
 - A. FDA
 - B. BARC
 - C. WHO
 - D. ICMR✓ **Answer: B. BARC (through AERB)**
- **896. HDR source is housed in:**
 - A. Imaging table
 - B. Teletherapy machine
 - C. Afterloader device
 - D. Manual cassette✓ **Answer: C. Afterloader device**
- **897. Radiosensitizer acts by:**
 - A. Shielding tumor
 - B. Increasing tumor oxygenation or DNA damage
 - C. Diluting radiation
 - D. Protecting normal tissue✓ **Answer: B. Increasing tumor oxygenation or DNA damage**



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- **898. LET affects which radiobiological parameter most?**
 - A. RBE
 - B. Dose rate
 - C. Window level
 - D. Exposure index✓ **Answer: A. RBE**
- **899. Which structure in male pelvis is most radiosensitive?**
 - A. Rectum
 - B. Bladder
 - C. Testes
 - D. Urethra✓ **Answer: C. Testes**
- **900. Therapeutic ratio is defined as:**
 - A. Tumor dose / total dose
 - B. Normal tissue tolerance / tumor control dose
 - C. Patient dose / machine output
 - D. None✓ **Answer: B. Normal tissue tolerance / tumor control dose**

-
- **COMPLETED! 900 Questions.**

• PET-CT Imaging

- **Section A: PET-CT Principles & Physics**
- **901. PET stands for:**
 - A. Photon Emission Tomography
 - B. Positron Emission Tomography
 - C. Proton Energy Transmission
 - D. Peripheral Emission Tracking✓ **Answer: B. Positron Emission Tomography**
- **902. The primary radionuclide used in PET is:**
 - A. Technetium-99m
 - B. Iodine-123
 - C. Fluorine-18
 - D. Gallium-67✓ **Answer: C. Fluorine-18**



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- **903. Fluorine-18 decays by:**
 - A. Gamma emission
 - B. Electron capture
 - C. Alpha decay
 - D. Positron emission (β^+ decay)

✓ **Answer: D. Positron emission (β^+ decay)**
- **904. The half-life of F-18 is approximately:**
 - A. 30 minutes
 - B. 110 minutes
 - C. 6 hours
 - D. 24 hours

✓ **Answer: B. 110 minutes**
- **905. Annihilation reaction in PET emits two photons of energy:**
 - A. 140 keV
 - B. 511 keV
 - C. 1.02 MeV
 - D. 200 keV

✓ **Answer: B. 511 keV**
- **906. The two photons in PET are emitted at an angle of:**
 - A. 45°
 - B. 90°
 - C. 120°
 - D. 180°

✓ **Answer: D. 180°**
- **907. Coincidence detection in PET requires photons to be detected within:**
 - A. 1–2 ns
 - B. 10–15 ms
 - C. 5–10 μ s
 - D. 50–100 ns

✓ **Answer: A. 1–2 ns**
- **908. The PET-CT scanner combines functional and:**
 - A. Molecular imaging
 - B. Structural (anatomical) imaging
 - C. Electrical impedance
 - D. Endoscopy

✓ **Answer: B. Structural (anatomical) imaging**
- **909. The CT portion of PET-CT is used for:**
 - A. Therapy planning
 - B. Attenuation correction and anatomical localization



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- C. Thermal mapping
- D. Radiation monitoring
- ✓ **Answer: B. Attenuation correction and anatomical localization**
- **910. Which physical principle allows PET to localize emission points?**
 - A. Doppler shift
 - B. Time-of-flight (TOF)
 - C. Photoelectric effect
 - D. Scintillation decay✓ **Answer: B. Time-of-flight (TOF)**
- **911. The most commonly used detector crystal in PET is:**
 - A. Sodium iodide (NaI)
 - B. BGO (Bismuth Germanate)
 - C. Cesium iodide
 - D. Gadolinium✓ **Answer: B. BGO (Bismuth Germanate)**
- **912. Time-of-flight PET improves:**
 - A. Radiation dose
 - B. Scanner portability
 - C. Spatial resolution and signal-to-noise ratio
 - D. Organ size estimation✓ **Answer: C. Spatial resolution and signal-to-noise ratio**
- **913. A PET scanner typically includes how many detector rings?**
 - A. 2–3
 - B. 5–6
 - C. 10–12
 - D. 20–30✓ **Answer: C. 10–12**
- **914. The full width at half maximum (FWHM) defines:**
 - A. Number of photons
 - B. Resolution of a PET image
 - C. Decay rate
 - D. Attenuation coefficient✓ **Answer: B. Resolution of a PET image**
- **915. The axial field of view (FOV) of a modern PET scanner is typically:**
 - A. 5–10 cm
 - B. 10–15 cm
 - C. 15–25 cm
 - D. 40–60 cm✓ **Answer: C. 15–25 cm**



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- **916. Dead time in PET detectors refers to:**
 - A. Patient waiting time
 - B. Data transfer delay
 - C. Time after one event during which another cannot be recorded
 - D. Delay in CT acquisition

✓ **Answer: C. Time after one event during which another cannot be recorded**
- **917. LSO (Lutetium Oxyorthosilicate) crystal is known for:**
 - A. High light output
 - B. Poor timing resolution
 - C. Long decay time
 - D. Use in MRI

✓ **Answer: A. High light output**
- **918. PET uses what kind of collimator?**
 - A. Lead parallel-hole
 - B. Fan beam
 - C. No physical collimator
 - D. Cone beam

✓ **Answer: C. No physical collimator**
- **919. What is attenuation correction?**
 - A. Removing poor-quality scans
 - B. Adjusting contrast
 - C. Correcting for photon absorption by tissues
 - D. Scaling CT images

✓ **Answer: C. Correcting for photon absorption by tissues**
- **920. In hybrid PET-CT systems, the CT scan is often used to:**
 - A. Enhance FDG uptake
 - B. Guide injection
 - C. Aid in attenuation correction
 - D. Calculate SUV directly

✓ **Answer: C. Aid in attenuation correction**
- **921. The SUV (Standardized Uptake Value) is calculated using:**
 - A. Activity concentration / injected dose
 - B. Activity concentration / (injected dose/body weight)
 - C. Radiation dose × time
 - D. mAs × exposure time

✓ **Answer: B. Activity concentration / (injected dose/body weight)**
- **922. Normal physiologic uptake of FDG occurs in:**
 - A. Brain and myocardium
 - B. Skin and nails



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- C. Spleen and retina
 - D. Lungs only
 - ✓ **Answer: A. Brain and myocardium**
 - **923. Brown fat in PET-CT can cause:**
 - A. Cold spots
 - B. False-positive FDG uptake
 - C. Signal loss
 - D. Metal artifacts✓ **Answer: B. False-positive FDG uptake**
 - **924. The minimal fasting period before FDG PET is:**
 - A. 1 hour
 - B. 2 hours
 - C. 4–6 hours
 - D. 12 hours✓ **Answer: C. 4–6 hours**
 - **925. High insulin levels before PET can cause:**
 - A. Improved brain uptake
 - B. Suppressed muscle uptake
 - C. Increased muscle uptake and reduced tumor contrast
 - D. Higher background in bone✓ **Answer: C. Increased muscle uptake and reduced tumor contrast**
-

PET-CT Imaging –

- ---
- **Section B: Radiopharmaceuticals & Preparation**
- **926. The most commonly used tracer in oncologic PET is:**
 - A. Iodine-131
 - B. Technetium-99m
 - C. FDG (Fluorodeoxyglucose)
 - D. Gallium-67✓ **Answer: C. FDG (Fluorodeoxyglucose)**
- **927. FDG is an analogue of:**
 - A. Fructose
 - B. Glucose



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C. Lactose

D. Sucrose

✓**Answer: B. Glucose**

- **928. FDG enters cells via:**

A. Passive diffusion

B. Na^+/K^+ pump

C. Glucose transporters (GLUT)

D. Active filtration

✓**Answer: C. Glucose transporters (GLUT)**

- **929. After phosphorylation, FDG becomes trapped in the cell because:**

A. It becomes radioactive

B. It is converted to ATP

C. It cannot undergo glycolysis

D. It binds DNA

✓**Answer: C. It cannot undergo glycolysis**

- **930. Which organ shows consistently high FDG uptake?**

A. Liver

B. Brain

C. Kidney

D. Spleen

✓**Answer: B. Brain**

- **931. False-positive FDG uptake can occur in:**

A. Renal cysts

B. Fibroids

C. Infections and inflammation

D. Old scars

✓**Answer: C. Infections and inflammation**

- **932. What is the typical dose of FDG for adult PET scan?**

A. 1–2 MBq

B. 30–50 MBq

C. 150–370 MBq

D. >1000 MBq

✓**Answer: C. 150–370 MBq**

- **933. The uptake time (injection to scan) for FDG-PET is usually:**

A. 15 minutes

B. 30 minutes

C. 45 minutes

D. 60 minutes

✓**Answer: D. 60 minutes**



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- **934. Patient preparation before FDG PET includes:**
 - A. Hydration and exercise
 - B. High-carb meal
 - C. Fasting and rest
 - D. Caffeine intake

✓ **Answer: C. Fasting and rest**
- **935. Blood glucose before FDG injection should be:**
 - A. <150 mg/dL
 - B. <180 mg/dL
 - C. >200 mg/dL
 - D. No restriction

✓ **Answer: A. <150 mg/dL**
- **936. Which PET tracer is useful for prostate cancer?**
 - A. FDG
 - B. Ga-68 PSMA
 - C. Tc-99m DTPA
 - D. I-131

✓ **Answer: B. Ga-68 PSMA**
- **937. What is the role of CT in PET-CT?**
 - A. It enhances tracer uptake
 - B. It fuses PET data with anatomy
 - C. It replaces PET
 - D. It replaces MRI

✓ **Answer: B. It fuses PET data with anatomy**
- **938. CT-based attenuation correction can result in artifacts if:**
 - A. Proper fasting is done
 - B. Metal implants or contrast agents are present
 - C. Breath-holding is used
 - D. Scanner is calibrated

✓ **Answer: B. Metal implants or contrast agents are present**
- **939. Which organ naturally excretes FDG?**
 - A. Liver
 - B. Lung
 - C. Kidney
 - D. Pancreas

✓ **Answer: C. Kidney**
- **940. To reduce urinary bladder uptake of FDG:**
 - A. Avoid water
 - B. Delay scan



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- C. Encourage hydration and voiding
 - D. Give furosemide
 - ✓ **Answer: C. Encourage hydration and voiding**
-

Section C: Image Quality & Radiation Safety

- **941. Time-of-flight PET improves image quality by:**
 - A. Reducing scan time only
 - B. Improving tumor-to-background contrast
 - C. Eliminating attenuation correction
 - D. Allowing free movement✓ **Answer: B. Improving tumor-to-background contrast**
- **942. PET resolution is typically around:**
 - A. 1 mm
 - B. 2–3 mm
 - C. 4–5 mm
 - D. 10 mm✓ **Answer: C. 4–5 mm**
- **943. Dual-time-point imaging in PET is used to:**
 - A. Reduce dose
 - B. Track tracer washout or uptake pattern
 - C. Improve oxygenation
 - D. Avoid sedation✓ **Answer: B. Track tracer washout or uptake pattern**
- **944. Which PET tracer is useful in brain amyloid imaging?**
 - A. FDG
 - B. C-11 Methionine
 - C. F-18 Florbetapir
 - D. I-123✓ **Answer: C. F-18 Florbetapir**
- **945. Radiation dose to patient from a PET-CT (whole body) is approx.:**
 - A. 1–2 mSv
 - B. 3–5 mSv
 - C. 7–14 mSv



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D. >20 mSv

✓ **Answer: C. 7–14 mSv**

- **946. The CT part contributes to how much of the total dose in PET-CT?**

A. 5%

B. 10–20%

C. 30–50%

D. >90%

✓ **Answer: C. 30–50%**

- **947. Shielding used for PET facilities must account for:**

A. 511 keV photons

B. 70 keV photons

C. 200 keV beta rays

D. 60 Co gamma

✓ **Answer: A. 511 keV photons**

- **948. Which is NOT an advantage of PET-CT?**

A. Functional + anatomical fusion

B. Accurate staging

C. High spatial resolution like MRI

D. Monitoring therapy response

✓ **Answer: C. High spatial resolution like MRI**

- **949. Which organization regulates radiopharmaceutical handling in India?**

A. WHO

B. FDA

C. AERB (Atomic Energy Regulatory Board)

D. NMC

✓ **Answer: C. AERB (Atomic Energy Regulatory Board)**

- **950. A typical PET-CT scan time (head to thigh) is approximately:**

A. 5 minutes

B. 10–25 minutes

C. 1 hour

D. 2 hours

✓ **Answer: B. 10–25 minutes**

-
- **Section D: Clinical Indications & Interpretation**

- **951. PET-CT is most sensitive for detecting:**

A. Calcifications

B. Fatty tumors

C. Metabolically active lesions



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- D. Fibrous tissue
✓ **Answer: C. Metabolically active lesions**
- **952. FDG PET is least useful for detecting:**
 - A. Lymphoma
 - B. Prostate cancer
 - C. Lung cancer
 - D. Colorectal cancer✓ **Answer: B. Prostate cancer**
- **953. PET-CT is often used in staging of:**
 - A. Liver cirrhosis
 - B. Breast cancer
 - C. Osteoarthritis
 - D. Urolithiasis✓ **Answer: B. Breast cancer**
- **954. Increased FDG uptake is typically seen in:**
 - A. Scar tissue
 - B. Inactive tumors
 - C. Inflammatory lesions
 - D. All of the above✓ **Answer: C. Inflammatory lesions**
- **955. FDG PET is best at detecting:**
 - A. Bone erosion
 - B. Cellular metabolism
 - C. Vascular calcification
 - D. Soft tissue anatomy✓ **Answer: B. Cellular metabolism**
- **956. FDG uptake in muscles can increase due to:**
 - A. Relaxation
 - B. Hyperthermia
 - C. Recent exercise or movement
 - D. Dehydration✓ **Answer: C. Recent exercise or movement**
- **957. Dual-time point imaging can help in:**
 - A. Radiation dose reduction
 - B. Differentiating benign vs malignant
 - C. Metal artifact removal
 - D. Injection tracking✓ **Answer: B. Differentiating benign vs malignant**



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- **958. The SUVmax value is most useful for:**
 - A. Image registration
 - B. Lesion quantification
 - C. Tracer injection
 - D. Attenuation correction

✓ **Answer: B. Lesion quantification**
- **959. FDG is not ideal in:**
 - A. Low-grade tumors
 - B. High-grade lymphomas
 - C. Lung cancers
 - D. Brain tumors

✓ **Answer: A. Low-grade tumors**
- **960. FDG uptake in the brain may interfere with:**
 - A. Stroke localization
 - B. Tumor detection
 - C. Infection evaluation
 - D. All of the above

✓ **Answer: D. All of the above**
- **961. What is the role of PET in epilepsy?**
 - A. Identify seizure focus
 - B. Increase seizure threshold
 - C. Confirm hypoglycemia
 - D. Detect meningitis

✓ **Answer: A. Identify seizure focus**
- **962. FDG PET is commonly used for:**
 - A. Autoimmune diagnosis
 - B. Cardiac viability assessment
 - C. Musculoskeletal trauma
 - D. All of the above

✓ **Answer: B. Cardiac viability assessment**
- **963. FDG PET may be falsely negative in:**
 - A. Active inflammation
 - B. Rapid growing tumors
 - C. Hyperglycemia
 - D. Sarcoidosis

✓ **Answer: C. Hyperglycemia**
- **964. The normal myocardial FDG uptake can be suppressed using:**
 - A. Glucose loading
 - B. High-carb diet



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- C. High-fat, low-carb diet
- D. Beta blockers
- ✓ **Answer: C. High-fat, low-carb diet**
- **965. In Alzheimer's disease, PET shows:**
 - A. Increased temporal activity
 - B. Decreased parietal and temporal FDG uptake
 - C. Enhanced frontal uptake
 - D. Normal pattern✓ **Answer: B. Decreased parietal and temporal FDG uptake**
- **966. FDG PET-CT can be helpful in:**
 - A. Osteoarthritis
 - B. Paget's disease
 - C. Fever of unknown origin (FUO)
 - D. Gallstones✓ **Answer: C. Fever of unknown origin (FUO)**
- **967. PET-CT in lymphoma is used for:**
 - A. Histology
 - B. Therapy response assessment
 - C. CBC correlation
 - D. Staging only✓ **Answer: B. Therapy response assessment**
- **968. PET-CT is better than bone scan in:**
 - A. Myositis
 - B. Osteoporosis
 - C. Detecting lytic bone metastases
 - D. Fracture healing✓ **Answer: C. Detecting lytic bone metastases**
- **969. FDG PET is not suitable in:**
 - A. Cardiac infarction
 - B. Multiple myeloma
 - C. Small renal tumors
 - D. Medullary thyroid cancer✓ **Answer: C. Small renal tumors**
- **970. Which tracer is better for NET (neuroendocrine tumor) imaging?**
 - A. FDG
 - B. Tc-99m DTPA
 - C. Ga-68 DOTATATE
 - D. I-123✓ **Answer: C. Ga-68 DOTATATE**



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- **971. Which tracer is used for cardiac perfusion PET?**
 - A. FDG
 - B. Rb-82
 - C. Ga-68 PSMA
 - D. Tc-99m MDP

✓Answer: B. Rb-82
- **972. PET-CT shows poor performance in:**
 - A. High-grade tumors
 - B. Obese patients
 - C. Slow-growing tumors
 - D. Fast-growing metastases

✓Answer: C. Slow-growing tumors
- **973. FDG PET imaging post-radiation should be delayed by:**
 - A. 2 days
 - B. 2 weeks
 - C. 6–12 weeks
 - D. 3 months

✓Answer: C. 6–12 weeks
- **974. The most common source of artifact in PET-CT is:**
 - A. Contrast
 - B. CT misregistration
 - C. Excess FDG
 - D. High-resolution mode

✓Answer: B. CT misregistration
- **975. False negatives in PET-CT may occur due to:**
 - A. High FDG dose
 - B. Lesions <5 mm
 - C. Bone metastases
 - D. Liver lesions

✓Answer: B. Lesions <5 mm

- **Section E: Emerging Trends, QA, and Limitations**

- **976. Which is an emerging application of PET-MRI?**
 - A. Cardiac pacemaker tracking
 - B. Simultaneous metabolic and soft-tissue imaging
 - C. Radiotherapy treatment
 - D. Lung ventilation

✓Answer: B. Simultaneous metabolic and soft-tissue imaging



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- **977. The term theranostics in nuclear medicine refers to:**
 - A. Therapy + diagnosis
 - B. Thermography + statistics
 - C. Therapy + statistics
 - D. Therapy-only approach

✓ **Answer: A. Therapy + diagnosis**
- **978. Which PET tracer is used for amyloid imaging?**
 - A. F-18 Florbetapir
 - B. Ga-68 PSMA
 - C. I-131
 - D. FDG

✓ **Answer: A. F-18 Florbetapir**
- **979. Quantitative accuracy of PET is affected by:**
 - A. Scatter correction
 - B. Time-of-flight
 - C. Attenuation correction
 - D. All of the above

✓ **Answer: D. All of the above**
- **980. Respiratory motion in PET leads to:**
 - A. Better signal
 - B. Image sharpening
 - C. Blurring and artifacts
 - D. Dose increase

✓ **Answer: C. Blurring and artifacts**
- **981. The best PET spatial resolution achievable is approximately:**
 - A. 0.5 mm
 - B. 1–2 mm
 - C. 4–5 mm
 - D. 10 mm

✓ **Answer: C. 4–5 mm**
- **982. Total-body PET scanners offer:**
 - A. Faster scans with reduced dose
 - B. Whole-body X-ray mapping
 - C. High-dose radiation
 - D. Slow acquisition

✓ **Answer: A. Faster scans with reduced dose**
- **983. PET-CT fusion image accuracy depends on:**
 - A. Software only
 - B. Physical co-registration



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- C. Patient position and motion control
- D. High SUV
- ✓ **Answer: C. Patient position and motion control**
- **984. Which is NOT a component of QA in PET-CT?**
 - A. Daily blank scan
 - B. Spatial resolution test
 - C. Beam collimation test
 - D. Normalization scan✓ **Answer: C. Beam collimation test**
- **985. OSEM (Ordered Subset Expectation Maximization) is a method of:**
 - A. Dose calculation
 - B. Detector calibration
 - C. Image reconstruction
 - D. Tracer synthesis✓ **Answer: C. Image reconstruction**
- **986. What parameter helps quantify PET-CT scanner performance?**
 - A. Spatial bandwidth
 - B. Noise index
 - C. NECR (Noise Equivalent Count Rate)
 - D. T1 relaxation✓ **Answer: C. NECR**
- **987. Quality control in PET includes:**
 - A. SUV reproducibility
 - B. CT tube performance
 - C. Annihilation peak detection
 - D. All of the above✓ **Answer: D. All of the above**
- **988. Which PET scan must be done with insulin-glucose clamp technique?**
 - A. Brain tumor
 - B. Myocardial viability
 - C. Hepatic lesion
 - D. Prostate cancer✓ **Answer: B. Myocardial viability**
- **989. Artifact due to metal implant in CT affects:**
 - A. PET resolution
 - B. PET attenuation correction
 - C. Only SUV
 - D. Only CT density✓ **Answer: B. PET attenuation correction**



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- **990. What is the 'halo artifact' in PET-CT?**
 - A. CT beam hardening
 - B. FDG spillover from kidneys or bladder
 - C. Motion during PET
 - D. Scatter ring

✓ **Answer: B. FDG spillover from kidneys or bladder**
- **991. SUV cutoff for malignancy in PET is commonly considered as:**
 - A. 1
 - B. 1.5
 - C. 2.5
 - D. 5.0

✓ **Answer: C. 2.5**
- **992. PET scan room shielding is higher than gamma camera because of:**
 - A. 140 keV photons
 - B. 511 keV annihilation photons
 - C. Lower background radiation
 - D. CT collimation

✓ **Answer: B. 511 keV annihilation photons**
- **993. After FDG injection, patient should:**
 - A. Exercise
 - B. Sit quietly in a dim room
 - C. Drink coffee
 - D. Use a treadmill

✓ **Answer: B. Sit quietly in a dim room**
- **994. PET-CT QA frequency includes:**
 - A. Annual calibration only
 - B. Weekly energy check
 - C. Daily, weekly, and periodic checks
 - D. Monthly injector checks

✓ **Answer: C. Daily, weekly, and periodic checks**
- **995. Normal muscle uptake in PET is:**
 - A. Always pathological
 - B. Increased after fasting
 - C. Increased with physical activity
 - D. Decreased with FDG

✓ **Answer: C. Increased with physical activity**
- **996. What is NOT a benefit of Time-of-Flight PET?**
 - A. Better localization
 - B. Reduced noise



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- C. Shorter scan times
- D. Eliminates need for CT

✓ **Answer: D. Eliminates need for CT**

- **997. Scatter correction is important in PET because:**

- A. It affects color map
- B. It improves quantification
- C. It alters mAs
- D. It reduces injection dose

✓ **Answer: B. It improves quantification**

- **998. Which is a limitation of PET-CT?**

- A. High soft tissue resolution
- B. Long acquisition time
- C. Low sensitivity
- D. Lack of tracer specificity

✓ **Answer: D. Lack of tracer specificity**

- **999. The injected activity of FDG is adjusted based on:**

- A. Gender
- B. Age
- C. Body weight
- D. Heart rate

✓ **Answer: C. Body weight**

- **1000. Whole-body PET-CT scan covers typically from:**

- A. Brain to bladder
- B. Head to mid-thigh
- C. Neck to knees
- D. Skull base to foot

✓ **Answer: B. Head to mid-thigh**

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- **Congratulations! You now have completed 1000 high-quality, clinically relevant solved MCQs across all major Radiology topics.**
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Interventional Radiology, Mammography & DSA

- **Section A: Interventional Radiology – Basics & Equipment**
- **1001. Interventional Radiology (IR) primarily uses:**
 - A. Ultrasound only
 - B. MRI only
 - C. Imaging to guide minimally invasive procedures
 - D. Surgical navigation systems

✓ **Answer: C. Imaging to guide minimally invasive procedures**
- **1002. The most common imaging modality used during IR procedures is:**
 - A. CT
 - B. X-ray fluoroscopy
 - C. PET
 - D. MRI

✓ **Answer: B. X-ray fluoroscopy**
- **1003. A common indication for IR-guided drainage is:**
 - A. Gallstones
 - B. Lung cancer
 - C. Abscess
 - D. Fracture

✓ **Answer: C. Abscess**
- **1004. Seldinger technique is used for:**
 - A. IV contrast injection
 - B. Needle biopsy
 - C. Vascular access
 - D. Catheter tip sterilization

✓ **Answer: C. Vascular access**



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- **1005. The first step in the Seldinger technique is:**
 - A. Insertion of guidewire
 - B. Withdrawal of needle
 - C. Vessel puncture with needle
 - D. Dilator insertion

✓ **Answer: C. Vessel puncture with needle**
- **1006. A guidewire is introduced after:**
 - A. The catheter is removed
 - B. Blood flow stops
 - C. Needle is in vessel lumen
 - D. Skin is incised

✓ **Answer: C. Needle is in vessel lumen**
- **1007. Angioplasty involves:**
 - A. Injecting thrombolytics
 - B. Balloon dilation of narrowed vessels
 - C. Surgical bypass
 - D. Removing a kidney

✓ **Answer: B. Balloon dilation of narrowed vessels**
- **1008. A stent is used to:**
 - A. Inject contrast
 - B. Bypass arteries
 - C. Keep vessels open
 - D. Perform biopsy

✓ **Answer: C. Keep vessels open**
- **1009. Embolization in IR refers to:**
 - A. Opening blocked arteries
 - B. Blocking blood flow to a target area
 - C. Extracting bone
 - D. Fluid drainage

✓ **Answer: B. Blocking blood flow to a target area**
- **1010. A common material for embolization is:**
 - A. Iron powder
 - B. Gel foam
 - C. CT contrast
 - D. Teflon

✓ **Answer: B. Gel foam**
- **1011. A complication of hepatic embolization includes:**
 - A. Sepsis
 - B. Liver necrosis



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C. Fever

D. All of the above

✓**Answer: D. All of the above**

- **1012. The most commonly used access site in IR is:**

A. Femoral artery

B. Radial vein

C. Carotid artery

D. Jugular vein

✓**Answer: A. Femoral artery**

- **1013. The primary role of the IR suite C-arm is:**

A. CT fusion

B. Real-time fluoroscopic guidance

C. MRI image overlay

D. PACS storage

✓**Answer: B. Real-time fluoroscopic guidance**

- **1014. Which catheter shape is commonly used in cerebral angiography?**

A. Pigtail

B. Cobra

C. Simmons

D. Multipurpose

✓**Answer: C. Simmons**

- **1015. Microcatheters are typically used for:**

A. Venous access only

B. Embolization in small arteries

C. Lung imaging

D. Bone marrow biopsies

✓**Answer: B. Embolization in small arteries**

- **1016. CO₂ can be used as a contrast in IR because it is:**

A. Radiopaque

B. Non-toxic and radiolucent

C. Magnetic

D. Better than iodine for cardiac scans

✓**Answer: B. Non-toxic and radiolucent**

- **1017. Which of the following is NOT a contraindication for angiography?**

A. Active bleeding

B. Coagulopathy

C. Contrast allergy

D. Renal insufficiency

✓**Answer: A. Active bleeding**



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- **1018. The term “road mapping” in IR means:**
 - A. Patient tracking
 - B. Using previous DICOMs
 - C. Superimposing real-time and static images
 - D. Mapping DSA overlays

✓**Answer: C. Superimposing real-time and static images**
- **1019. What is an IVC filter used for?**
 - A. Renal obstruction
 - B. Cardiac arrest
 - C. Pulmonary embolism prevention
 - D. Liver cirrhosis

✓**Answer: C. Pulmonary embolism prevention**
- **1020. Most embolization procedures use imaging via:**
 - A. CT only
 - B. MRI only
 - C. Fluoroscopy with digital subtraction
 - D. Ultrasound alone

✓**Answer: C. Fluoroscopy with digital subtraction**
- **1021. Which IR procedure is most often used to manage uterine fibroids?**
 - A. Cryoablation
 - B. Uterine artery embolization (UAE)
 - C. Hysterectomy
 - D. Ablative therapy

✓**Answer: B. Uterine artery embolization (UAE)**
- **1022. The dose to staff in IR is highest from:**
 - A. Scatter from patient
 - B. Detector leakage
 - C. Primary beam
 - D. CT scanner

✓**Answer: A. Scatter from patient**
- **1023. Lead aprons in IR should have minimum thickness of:**
 - A. 0.1 mm Pb
 - B. 0.25 mm Pb
 - C. 0.5 mm Pb
 - D. 1.0 mm Pb

✓**Answer: C. 0.5 mm Pb**
- **1024. Which personal dosimeter is best suited for IR?**
 - A. Film badge
 - B. Pocket dosimeter



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C. TLD worn at collar outside apron

D. Ring dosimeter only

✓ **Answer: C. TLD worn at collar outside apron**

- **1025. The fluoroscopy dose in IR is minimized by:**

A. Using larger FOV

B. Increasing pulse rate

C. Collimating and using pulsed fluoroscopy

D. Removing filters

✓ **Answer: C. Collimating and using pulsed fluoroscopy**

- **Section B: Mammography – Physics & Techniques**

- **1026. The primary goal of mammography is to detect:**

A. Bone tumors

B. Brain abnormalities

C. Early breast cancer

D. Vascular stenosis

✓ **Answer: C. Early breast cancer**

- **1027. The typical X-ray tube target material in mammography is:**

A. Tungsten

B. Molybdenum

C. Aluminum

D. Copper

✓ **Answer: B. Molybdenum**

- **1028. Molybdenum targets emit:**

A. High-energy X-rays

B. Low-energy characteristic X-rays (17–19 keV)

C. Neutrons

D. Beta particles

✓ **Answer: B. Low-energy characteristic X-rays (17–19 keV)**

- **1029. The typical tube voltage used in mammography is:**

A. 20–30 kVp

B. 60–90 kVp

C. 100–120 kVp

D. 5–10 kVp

✓ **Answer: A. 20–30 kVp**

- **1030. The purpose of compression in mammography includes all EXCEPT:**

A. Reduce motion blur



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- B. Reduce tissue overlap
- C. Increase scatter
- D. Improve image sharpness

✓ **Answer: C. Increase scatter**

- **1031. The AEC (automatic exposure control) in mammography helps to:**

- A. Compress the breast
- B. Focus the beam
- C. Adjust mAs based on tissue density
- D. Move the detector

✓ **Answer: C. Adjust mAs based on tissue density**

- **1032. The common views in screening mammography are:**

- A. AP and lateral
- B. PA and lateral
- C. CC and MLO
- D. Axial and coronal

✓ **Answer: C. CC and MLO**

- **1033. The benefit of grid use in mammography is to:**

- A. Increase image noise
- B. Decrease contrast
- C. Reduce scatter radiation
- D. Increase beam intensity

✓ **Answer: C. Reduce scatter radiation**

- **1034. Digital mammography differs from conventional film mammography by:**

- A. Using CR only
- B. Reducing patient dose always
- C. Allowing image manipulation and PACS integration
- D. Using higher tube voltages

✓ **Answer: C. Allowing image manipulation and PACS integration**

- **1035. A breast lesion seen only on one view likely represents:**

- A. Artifact
- B. True lesion
- C. Normal anatomy
- D. Positioning error

✓ **Answer: A. Artifact**

- **1036. What is the MQSA in mammography?**

- A. Mammogram Quality and Scan Assurance
- B. Medical Quality Standard Act
- C. Mammography Quality Standards Act



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D. Mandatory Quality Score Assessment

✓ **Answer: C. Mammography Quality Standards Act**

- **1037. A typical focal spot size in mammography is:**

A. 1.2 mm

B. 0.6 mm

C. 0.3 mm

D. 2.5 mm

✓ **Answer: C. 0.3 mm**

- **1038. Magnification mammography improves:**

A. Radiation dose

B. Noise

C. Visibility of microcalcifications

D. Image blur

✓ **Answer: C. Visibility of microcalcifications**

- **1039. Which material is used as a filter in mammography?**

A. Copper

B. Molybdenum or Rhodium

C. Tungsten

D. Lead

✓ **Answer: B. Molybdenum or Rhodium**

- **1040. The average glandular dose per mammographic view is:**

A. <0.5 mGy

B. 1–2 mGy

C. 5–10 mGy

D. >20 mGy

✓ **Answer: B. 1–2 mGy**

- ---

- **Section C: Digital Subtraction Angiography (DSA) – Introduction**

- **1041. The key feature of DSA is:**

A. Use of ultrasound for guidance

B. Subtraction of pre-contrast image from post-contrast image

C. Metal artifact removal

D. CT fusion with PET

✓ **Answer: B. Subtraction of pre-contrast image from post-contrast image**

- **1042. DSA is primarily used to visualize:**

A. Brain parenchyma

B. Bones

C. Blood vessels



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- D. Glandular tissue
✓ **Answer: C. Blood vessels**
- **1043. In DSA, images are acquired at:**
 - A. Very slow speeds
 - B. Static 3D angles
 - C. Rapid frame rates (e.g. 2–6 frames/sec)
 - D. One frame per minute✓ **Answer: C. Rapid frame rates (e.g. 2–6 frames/sec)**
- **1044. What helps reduce patient motion artifacts in DSA?**
 - A. CT gating
 - B. High mAs
 - C. Breath holding and immobilization
 - D. Detector rotation✓ **Answer: C. Breath holding and immobilization**
- **1045. The contrast media used in DSA are typically:**
 - A. Radiolucent gases
 - B. Barium sulfate
 - C. Non-ionic iodinated contrast
 - D. Gadolinium✓ **Answer: C. Non-ionic iodinated contrast**
- **1046. Which is a major advantage of DSA over conventional angiography?**
 - A. No contrast needed
 - B. Real-time cross-sectional imaging
 - C. Enhanced visualization by background subtraction
 - D. MRI compatibility✓ **Answer: C. Enhanced visualization by background subtraction**
- **1047. Bolus timing in DSA is critical to:**
 - A. Reduce contrast dose
 - B. Synchronize contrast arrival with image acquisition
 - C. Reduce noise
 - D. Increase image file size✓ **Answer: B. Synchronize contrast arrival with image acquisition**
- **1048. DSA is most useful in detecting:**
 - A. Diffuse lung disease
 - B. Coronary plaque
 - C. Vascular stenosis and occlusion
 - D. Gallstones✓ **Answer: C. Vascular stenosis and occlusion**



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- **1049. One drawback of DSA is:**
 - A. Low radiation dose
 - B. Long scan time
 - C. Susceptibility to motion and metallic artifacts
 - D. No real-time capability

✓ **Answer: C. Susceptibility to motion and metallic artifacts**
 - **1050. Subtraction in DSA is achieved using:**
 - A. MRI gradient reversal
 - B. PACS filters
 - C. Mask and live images
 - D. Dual-energy X-ray

✓ **Answer: C. Mask and live images**
-
- **Section D: DSA Advanced Techniques & QA**
 - **1051. Roadmap technique in DSA is helpful for:**
 - A. MRI fusion
 - B. Tracking catheter over pre-acquired vascular map
 - C. Enhancing bone detail
 - D. Noise suppression

✓ **Answer: B. Tracking catheter over pre-acquired vascular map**
 - **1052. Digital subtraction helps remove:**
 - A. Bones and soft tissues from vascular images
 - B. Noise artifacts
 - C. Collimator scatter
 - D. Patient movement

✓ **Answer: A. Bones and soft tissues from vascular images**
 - **1053. Temporal subtraction in DSA involves:**
 - A. Dual-energy imaging
 - B. Taking images at different time points
 - C. Removing CT artifacts
 - D. Automatic brightness correction

✓ **Answer: B. Taking images at different time points**
 - **1054. DSA is not suitable for patients with:**
 - A. Renal impairment
 - B. Atherosclerosis
 - C. Atrial fibrillation



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D. Hypertension

✓ **Answer: A. Renal impairment**

- **1055. Catheter tip movement during acquisition can cause:**

A. Metal artifact

B. Subtraction error artifact

C. Grid cutoff

D. Alignment correction

✓ **Answer: B. Subtraction error artifact**

- **1056. What is “bolus chasing” in DSA or CTA?**

A. Continuous imaging of contrast flow

B. Delayed contrast administration

C. Manual injection

D. Gamma correction

✓ **Answer: A. Continuous imaging of contrast flow**

- **1057. The most critical factor for DSA image clarity is:**

A. High kVp

B. Short exposure time and high frame rate

C. Wide collimation

D. Use of CT filters

✓ **Answer: B. Short exposure time and high frame rate**

- **1058. The common complication during cerebral DSA is:**

A. Pneumothorax

B. Stroke due to emboli

C. Cardiac arrest

D. Seizure

✓ **Answer: B. Stroke due to emboli**

- **1059. Which helps in reducing motion artifacts in DSA?**

A. Anticholinergic agents

B. Bismuth shielding

C. Patient immobilization

D. High-dose CT scan

✓ **Answer: C. Patient immobilization**

- **1060. QA in DSA includes checking for:**

A. Focal spot blur

B. Subtraction efficiency

C. AEC calibration

D. Tube warm-up

✓ **Answer: B. Subtraction efficiency**



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- **1061. A common QA phantom used in DSA includes:**
 - A. Copper step wedge
 - B. Leeds test object
 - C. CTDI head phantom
 - D. Breast tissue equivalent phantom

✓ **Answer: B. Leeds test object**
- **1062. Quality control in IR suites includes:**
 - A. Fluoro timer checks
 - B. AEC chamber calibration
 - C. Laser alignment
 - D. Pixel binning

✓ **Answer: A. Fluoro timer checks**
- **1063. In mammography, a failing phantom image typically shows:**
 - A. Overexposure
 - B. Loss of fiber or speck visibility
 - C. Ring artifact
 - D. Excessive edge enhancement

✓ **Answer: B. Loss of fiber or speck visibility**
- **1064. Common QA tests in mammography include all EXCEPT:**
 - A. Spatial resolution
 - B. Uniformity
 - C. Beam collimation
 - D. Gradient echo delay

✓ **Answer: D. Gradient echo delay**
- **1065. Which is NOT tested during routine IR QA?**
 - A. Dose-area product meter
 - B. Focal spot size
 - C. MRI coil linearity
 - D. Exposure time accuracy

✓ **Answer: C. MRI coil linearity**
- **1066. DSA QA should be performed:**
 - A. Weekly only
 - B. Monthly only
 - C. At regular intervals (daily/weekly/monthly)
 - D. Only during commissioning

✓ **Answer: C. At regular intervals (daily/weekly/monthly)**
- **1067. Lead aprons should be tested for cracks:**
 - A. Annually
 - B. Monthly



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C. Weekly

D. Once every 5 years

✓ **Answer: A. Annually**

- **1068. IR radiation dose can be minimized by:**

A. Using continuous fluoroscopy

B. Last image hold and collimation

C. Raising kVp excessively

D. Avoiding filtration

✓ **Answer: B. Last image hold and collimation**

- **1069. The dose indicator commonly displayed during IR procedures is:**

A. CTDIvol

B. Dose length product

C. Kerma-area product (KAP)

D. Half-value layer

✓ **Answer: C. Kerma-area product (KAP)**

- **1070. For mammography, the compression force should be:**

A. 1–2 N

B. 5–15 N

C. 10–20 daN (deca Newtons)

D. 50–100 lbs

✓ **Answer: C. 10–20 daN (deca Newtons)**

- **1071. DSA systems use what type of detectors?**

A. Photostimulable phosphor

B. Flat panel detectors

C. Ion chambers

D. Film cassettes

✓ **Answer: B. Flat panel detectors**

- **1072. X-ray tube heating in IR procedures is monitored via:**

A. Tube load indicator

B. Filtration index

C. Pre-pulse mapping

D. Laser heat sensor

✓ **Answer: A. Tube load indicator**

- **1073. What increases spatial resolution in DSA imaging?**

A. Low pixel density

B. Smaller focal spot and high matrix size

C. High kVp

D. Thick filters

✓ **Answer: B. Smaller focal spot and high matrix size**



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- **1074. One benefit of pulsed fluoroscopy over continuous is:**
 - A. Higher dose
 - B. Lower dose and reduced motion blur
 - C. More scatter
 - D. Shorter exposure time

✓ **Answer: B. Lower dose and reduced motion blur**
- **1075. Which angiographic catheter is commonly used in renal angiography?**
 - A. Cobra
 - B. Pigtail
 - C. Simmons
 - D. Sidewinder

✓ **Answer: A. Cobra**
- ---
- **Section E: IR Clinical Applications & Complications**
- **1076. A TIPS procedure is performed for:**
 - A. Liver metastases
 - B. Portal hypertension
 - C. Kidney stones
 - D. Brain abscess

✓ **Answer: B. Portal hypertension**
- **1077. Most common complication of central venous catheter placement is:**
 - A. Stroke
 - B. Cardiac arrest
 - C. Pneumothorax
 - D. Seizure

✓ **Answer: C. Pneumothorax**
- **1078. Which embolic agent is permanent?**
 - A. Gel foam
 - B. PVA particles
 - C. Saline
 - D. CO₂

✓ **Answer: B. PVA particles**
- **1079. Cryoablation in IR uses:**
 - A. Laser heating
 - B. Radio waves
 - C. Freezing technique with argon gas
 - D. CT fusion

✓ **Answer: C. Freezing technique with argon gas**



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- **1080. Biopsy needles are guided under:**
 - A. PET
 - B. Ultrasound or CT
 - C. MRI
 - D. Gamma camera

✓ **Answer: B. Ultrasound or CT**
- **1081. Vertebroplasty is used to:**
 - A. Decompress nerves
 - B. Treat spinal fractures by injecting cement
 - C. Treat scoliosis
 - D. Excise vertebral tumors

✓ **Answer: B. Treat spinal fractures by injecting cement**
- **1082. IR procedure to treat BPH is called:**
 - A. Transurethral resection
 - B. Urethroplasty
 - C. Prostate artery embolization
 - D. Pelvic angiography

✓ **Answer: C. Prostate artery embolization**
- **1083. Most common indication for uterine fibroid embolization is:**
 - A. Infertility
 - B. Pelvic infection
 - C. Heavy menstrual bleeding
 - D. Uterine rupture

✓ **Answer: C. Heavy menstrual bleeding**
- **1084. Post-embolization syndrome includes:**
 - A. Fever, pain, leukocytosis
 - B. Seizures
 - C. Paralysis
 - D. Jaundice

✓ **Answer: A. Fever, pain, leukocytosis**
- **1085. Complication of hepatic chemoembolization:**
 - A. Renal failure
 - B. Bowel ischemia
 - C. Post-embolization syndrome
 - D. Aortic rupture

✓ **Answer: C. Post-embolization syndrome**
- **1086. RFA (radiofrequency ablation) is used to treat:**
 - A. Spinal tumors
 - B. Renal stones



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C. Liver tumors

D. Joint degeneration

✓**Answer: C. Liver tumors**

• **1087. RFA causes:**

A. Tissue freezing

B. Coagulative necrosis via heat

C. Radiation necrosis

D. Enzyme lysis

✓**Answer: B. Coagulative necrosis via heat**

• **1088. IR-guided thrombolysis is indicated in:**

A. DVT

B. AVMs

C. Brain tumors

D. Diabetic foot

✓**Answer: A. DVT**

• **1089. Complication of stent placement includes:**

A. Stent migration

B. Vessel perforation

C. Re-occlusion

D. All of the above

✓**Answer: D. All of the above**

• **1090. The renal access in PCNL is commonly achieved through:**

A. Jugular vein

B. Femoral artery

C. Posterior calyx via ultrasound

D. Abdominal laparotomy

✓**Answer: C. Posterior calyx via ultrasound**

• **1091. Most common tumor treated by uterine artery embolization is:**

A. Endometrial carcinoma

B. Cervical carcinoma

C. Leiomyoma (fibroid)

D. Adenocarcinoma

✓**Answer: C. Leiomyoma (fibroid)**

• **1092. Angioplasty balloon size is selected based on:**

A. Patient weight

B. Blood pressure

C. Vessel diameter

D. Contrast agent

✓**Answer: C. Vessel diameter**



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- **1093. Biopsy site bleeding is minimized by:**
 - A. Avoiding anticoagulants
 - B. Using smaller gauge needles
 - C. Applying manual compression
 - D. All of the above

✓ **Answer: D. All of the above**
- **1094. Hepatic vein catheterization is required in:**
 - A. TACE
 - B. TIPS
 - C. Portal biopsy
 - D. Thoracic drainage

✓ **Answer: B. TIPS**
- **1095. The main radiation hazard in IR is due to:**
 - A. Scattered radiation from the patient
 - B. Primary beam leakage
 - C. Gamma emissions
 - D. Detector overload

✓ **Answer: A. Scattered radiation from the patient**
- **1096. The best method to reduce operator dose in IR is:**
 - A. Increasing mAs
 - B. Using lead shields and distance
 - C. Removing filters
 - D. Increasing pulse rate

✓ **Answer: B. Using lead shields and distance**
- **1097. When performing procedures in children, IR dose should be:**
 - A. Same as adults
 - B. Reduced with size-appropriate settings
 - C. Increased for clarity
 - D. Ignored if below 5 minutes

✓ **Answer: B. Reduced with size-appropriate settings**
- **1098. Transjugular liver biopsy is indicated when:**
 - A. Coagulopathy is present
 - B. Liver is enlarged
 - C. Kidney failure occurs
 - D. Biliary obstruction is seen

✓ **Answer: A. Coagulopathy is present**
- **1099. IR is preferred over surgery when:**
 - A. Open access is easier
 - B. Minimally invasive approach is safer



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- C. Hospital stay is irrelevant
 - D. Cost is not a concern
 - ✓ **Answer: B. Minimally invasive approach is safer**
 - **1100. The term “endoleak” is related to which IR procedure?**
 - A. TACE
 - B. EVAR (Endovascular Aneurysm Repair)
 - C. Chemoembolization
 - D. PCNL
 - ✓ **Answer: B. EVAR (Endovascular Aneurysm Repair)**
-

• Radiographic Anatomy & Physiology –

- **Section A: General Anatomy, Planes & Terminology**
- **1101. The plane that divides the body into right and left halves is the:**
 - A. Coronal plane
 - B. Sagittal plane
 - C. Transverse plane
 - D. Axial plane
- ✓ **Answer: B. Sagittal plane**
- **1102. The term “proximal” refers to a structure:**
 - A. Away from the midline
 - B. Nearer to the origin or trunk
 - C. Toward the surface
 - D. Lower in position
- ✓ **Answer: B. Nearer to the origin or trunk**
- **1103. The opposite of anterior is:**
 - A. Posterior
 - B. Medial
 - C. Superior
 - D. Proximal
- ✓ **Answer: A. Posterior**
- **1104. Transverse plane divides the body into:**
 - A. Superior and inferior parts
 - B. Right and left parts
 - C. Front and back



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- D. Equal halves
✓ **Answer: A. Superior and inferior parts**
 - **1105. Which of the following terms describes "away from the midline"?**
 - A. Medial
 - B. Lateral
 - C. Proximal
 - D. Distal✓ **Answer: B. Lateral**
 - **1106. In radiographic positioning, "PA projection" refers to:**
 - A. Posterior side facing the detector
 - B. Anteroposterior direction
 - C. Beam entering posterior and exiting anterior
 - D. Beam entering anterior and exiting posterior✓ **Answer: D. Beam entering anterior and exiting posterior**
 - **1107. The "oblique" view is used to demonstrate:**
 - A. Flat bone anatomy
 - B. Overlapping structures
 - C. Axial structures only
 - D. Bones in cross-section✓ **Answer: B. Overlapping structures**
 - **1108. Which anatomical region is superior to the abdomen?**
 - A. Pelvis
 - B. Thorax
 - C. Leg
 - D. Inguinal region✓ **Answer: B. Thorax**
 - **1109. "Ipsilateral" means:**
 - A. On the opposite side
 - B. In the same direction
 - C. On the same side
 - D. Crossing the midline✓ **Answer: C. On the same side**
 - **1110. In radiographic anatomy, a "decubitus" position means:**
 - A. Standing upright
 - B. Sitting erect
 - C. Lying down with horizontal beam
 - D. Head-first prone position✓ **Answer: C. Lying down with horizontal beam**
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- **Section B: Skeletal System**
- **1111. The longest bone in the body is the:**
 - A. Tibia
 - B. Femur
 - C. Humerus
 - D. Radius✓ **Answer: B. Femur**
- **1112. The total number of vertebrae in a normal adult spine is:**
 - A. 30
 - B. 24
 - C. 33
 - D. 27✓ **Answer: C. 33**
- **1113. The carpal bone that articulates with the radius is:**
 - A. Pisiform
 - B. Hamate
 - C. Scaphoid
 - D. Capitate✓ **Answer: C. Scaphoid**
- **1114. The axial skeleton includes:**
 - A. Limbs only
 - B. Skull, spine, ribs, sternum
 - C. Shoulder girdle
 - D. Pelvic girdle✓ **Answer: B. Skull, spine, ribs, sternum**
- **1115. Which structure is located between the femur and tibia?**
 - A. Patella
 - B. Fibula
 - C. Meniscus
 - D. Trochanter✓ **Answer: C. Meniscus**
- **1116. The number of ribs in the human body is:**
 - A. 10
 - B. 12 pairs
 - C. 11
 - D. 13 pairs✓ **Answer: B. 12 pairs**



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- **1117. The sella turcica is part of the:**
 - A. Frontal bone
 - B. Sphenoid bone
 - C. Temporal bone
 - D. Ethmoid bone

✓Answer: B. Sphenoid bone
- **1118. The acetabulum is found in the:**
 - A. Skull
 - B. Shoulder
 - C. Hip
 - D. Spine

✓Answer: C. Hip
- **1119. The olecranon process is part of the:**
 - A. Radius
 - B. Ulna
 - C. Humerus
 - D. Scapula

✓Answer: B. Ulna
- **1120. The cervical spine has how many vertebrae?**
 - A. 6
 - B. 7
 - C. 8
 - D. 12

✓Answer: B. 7
- **1121. The sacrum is formed by fusion of how many bones?**
 - A. 3
 - B. 5
 - C. 7
 - D. 10

✓Answer: B. 5
- **1122. The dens or odontoid process is part of:**
 - A. C1
 - B. C2
 - C. C7
 - D. T1

✓Answer: B. C2
- **1123. The glenoid cavity articulates with the:**
 - A. Ulna
 - B. Humerus



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- C. Radius
- D. Clavicle

✓**Answer: B. Humerus**

- **1124. The foramen magnum is found in the:**

- A. Frontal bone
- B. Occipital bone
- C. Parietal bone
- D. Temporal bone

✓**Answer: B. Occipital bone**

- **1125. Which bone has a trochanter?**

- A. Femur
- B. Humerus
- C. Radius
- D. Ulna

✓**Answer: A. Femur**

- **1126. The pelvic brim separates:**

- A. Ilium from pubis
- B. True and false pelvis
- C. Pelvis and abdomen
- D. Bladder and rectum

✓**Answer: B. True and false pelvis**

- **1127. The humerus articulates distally with:**

- A. Scapula
- B. Radius and ulna
- C. Clavicle
- D. Carpal bones

✓**Answer: B. Radius and ulna**

- **1128. The bone forming the forehead is the:**

- A. Parietal
- B. Frontal
- C. Temporal
- D. Occipital

✓**Answer: B. Frontal**

- **1129. Which part of a long bone contains red marrow in adults?**

- A. Epiphysis
- B. Diaphysis
- C. Metaphysis
- D. Periosteum

✓**Answer: A. Epiphysis**



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- **1130. The radiographic appearance of osteoarthritis often includes:**

- A. Soft tissue swelling
- B. Joint space narrowing and osteophytes
- C. Bone expansion
- D. Fracture lines

✓ **Answer: B. Joint space narrowing and osteophytes**

-

- **Section C: Thorax & Chest Anatomy**

- **1131. The trachea bifurcates at the level of:**

- A. T1
- B. T4–T5 (carina)
- C. C6
- D. T7

✓ **Answer: B. T4–T5 (carina)**

- **1132. The right lung has how many lobes?**

- A. 2
- B. 3
- C. 1
- D. 4

✓ **Answer: B. 3**

- **1133. The left lung has how many lobes?**

- A. 2
- B. 3
- C. 1
- D. 4

✓ **Answer: A. 2**

- **1134. The heart shadow is normally located on a chest X-ray in the:**

- A. Upper right zone
- B. Left middle and lower zones
- C. Right lung field
- D. Gastric air bubble

✓ **Answer: B. Left middle and lower zones**

- **1135. The hilum of the lungs contains:**

- A. Only bronchi
- B. Bronchi, vessels, nerves, lymphatics
- C. Alveoli
- D. Pulmonary ligaments

✓ **Answer: B. Bronchi, vessels, nerves, lymphatics**



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- **1136. The most anterior chamber of the heart on a lateral chest X-ray is the:**
 - A. Right atrium
 - B. Right ventricle
 - C. Left atrium
 - D. Left ventricle

✓Answer: B. Right ventricle
- **1137. A well-inspired PA chest X-ray shows how many posterior ribs above the diaphragm?**
 - A. 6
 - B. 7
 - C. 10
 - D. 12

✓Answer: C. 10
- **1138. The diaphragm appears higher on which side?**
 - A. Left
 - B. Right
 - C. Equal
 - D. Depends on patient gender

✓Answer: B. Right
- **1139. On a PA chest X-ray, the gastric air bubble is typically located:**
 - A. Below the liver
 - B. Right upper abdomen
 - C. Left upper abdomen, below diaphragm
 - D. In the left lung base

✓Answer: C. Left upper abdomen, below diaphragm
- **1140. A silhouette sign in chest radiography suggests:**
 - A. Fracture
 - B. Fluid in lungs
 - C. Loss of normal interface between structures (e.g., heart and lung)
 - D. Increased gas

✓Answer: C. Loss of normal interface between structures (e.g., heart and lung)
-
-
- **Section D: Abdomen & Organs – Radiographic Relevance**
- **1141. The liver is located primarily in which abdominal quadrant?**
 - A. LUQ
 - B. RUQ
 - C. LLQ



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D. RLQ

✓Answer: B. RUQ

- 1142. The kidney is usually located at the level of:

A. T2–T3

B. T12–L3

C. L5–S1

D. T6–T7

✓Answer: B. T12–L3

- 1143. Which organ crosses the midline in the abdomen?

A. Spleen

B. Liver

C. Pancreas

D. Gallbladder

✓Answer: C. Pancreas

- 1144. The normal diameter of the small bowel on abdominal X-ray is:

A. <2 cm

B. <3 cm

C. <5 cm

D. <7 cm

✓Answer: B. <3 cm

- 1145. Which organ appears as a gas-filled shadow under the left diaphragm?

A. Stomach

B. Liver

C. Kidney

D. Colon

✓Answer: A. Stomach

- 1146. The spleen is located in which quadrant?

A. RLQ

B. RUQ

C. LUQ

D. LLQ

✓Answer: C. LUQ

- 1147. A KUB radiograph typically includes:

A. Skull, thorax, and extremities

B. Kidneys, ureters, and bladder

C. Knee, ulna, and bone

D. Stomach and duodenum

✓Answer: B. Kidneys, ureters, and bladder



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- **1148. The psoas muscle shadow on an abdominal radiograph indicates:**
 - A. Liver disease
 - B. Normal retroperitoneal structure visibility
 - C. A tumor
 - D. A collapsed bowel

✓ **Answer: B. Normal retroperitoneal structure visibility**
- **1149. Which of the following organs is retroperitoneal?**
 - A. Liver
 - B. Stomach
 - C. Kidney
 - D. Spleen

✓ **Answer: C. Kidney**
- **1150. On abdominal radiograph, which structure commonly shows haustral markings?**
 - A. Small bowel
 - B. Colon
 - C. Pancreas
 - D. Stomach

✓ **Answer: B. Colon**

- **Section E: Urinary System**

- **1151. The functional unit of the kidney is called the:**
 - A. Neuron
 - B. Nephron
 - C. Glomerulus



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D. Tubule

✓ **Answer: B. Nephron**

- **1152. The normal position of kidneys in radiographs is between:**

A. T2–T4

B. T9–L2

C. T12–L3

D. L5–S1

✓ **Answer: C. T12–L3**

- **1153. Which structure carries urine from the kidney to the bladder?**

A. Urethra

B. Loop of Henle

C. Renal pelvis

D. Ureter

✓ **Answer: D. Ureter**

- **1154. The bladder is best visualized in which projection?**

A. Chest PA

B. Lateral skull

C. Pelvis AP

D. AP lumbar spine

✓ **Answer: C. Pelvis AP**

- **1155. The triangular area at the base of the bladder is the:**

A. Calyx

B. Hilum

C. Cortex

D. Trigone

✓ **Answer: D. Trigone**

- **1156. Intravenous urography (IVU) helps assess:**

A. Renal blood flow

B. Bone density

C. Urinary tract patency

D. Liver function

✓ **Answer: C. Urinary tract patency**

- **1157. In KUB X-rays, the kidneys are usually located:**

A. Above T6

B. Obscured by stomach gas

C. Lateral to the spine

D. Posterior to bladder

✓ **Answer: C. Lateral to the spine**



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- **1158. Which imaging is most sensitive to detect renal stones?**
 - A. Chest X-ray
 - B. KUB X-ray
 - C. MRI
 - D. CT (non-contrast)

✓ **Answer: D. CT (non-contrast)**
- **1159. Hydronephrosis on X-ray appears as:**
 - A. Gas-filled renal shadow
 - B. Dilated calyces
 - C. Collapsed bladder
 - D. Hyperdense capsule

✓ **Answer: B. Dilated calyces**
- **1160. The urethra in females is:**
 - A. Longer than in males
 - B. Shorter and more prone to infection
 - C. Not visualized on X-ray
 - D. Present only in children

✓ **Answer: B. Shorter and more prone to infection**
- **1161. A horseshoe kidney is a:**
 - A. Tumor
 - B. Stone
 - C. Congenital fusion of kidneys
 - D. Urinary tract infection

✓ **Answer: C. Congenital fusion of kidneys**
- **1162. Best position to demonstrate kidney mobility is:**
 - A. Lateral decubitus
 - B. Erect and supine (for nephroptosis)
 - C. Prone
 - D. Trendelenburg

✓ **Answer: B. Erect and supine (for nephroptosis)**
- **1163. Renal cortex appears as:**
 - A. Radiopaque ring
 - B. Radiolucent outline
 - C. Homogeneous soft tissue density
 - D. Gas-filled shadow

✓ **Answer: C. Homogeneous soft tissue density**
- **1164. Which structure lies anterior to the psoas muscle on KUB?**
 - A. Colon
 - B. Kidney



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- C. Liver
- D. Ureter

✓ **Answer: D. Ureter**

- **1165. Bladder outlet obstruction can be best seen in:**
 - A. Skull X-ray
 - B. Lateral chest
 - C. Voiding cystourethrogram (VCUG)
 - D. Abdominal ultrasound

✓ **Answer: C. Voiding cystourethrogram (VCUG)**

- **Section F: Nervous System**

- **1166. The brain structure that connects both hemispheres is:**
 - A. Medulla
 - B. Corpus callosum
 - C. Cerebellum
 - D. Pituitary

✓ **Answer: B. Corpus callosum**

- **1167. The spinal cord ends at which vertebral level?**
 - A. L1–L2
 - B. T12
 - C. L4
 - D. C7

✓ **Answer: A. L1–L2**

- **1168. The radiographic view for sella turcica is:**
 - A. Waters view
 - B. Lateral skull
 - C. PA chest
 - D. Axial lumbar

✓ **Answer: B. Lateral skull**

- **1169. CSF (cerebrospinal fluid) is primarily produced by:**
 - A. Medulla
 - B. Pineal gland
 - C. Choroid plexus
 - D. Pituitary

✓ **Answer: C. Choroid plexus**

- **1170. The cerebellum controls:**
 - A. Breathing
 - B. Emotions



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- C. Coordination and balance
- D. Vision
- ✓ **Answer: C. Coordination and balance**
- **1171. Which modality is best for evaluating the brain?**
 - A. X-ray
 - B. MRI
 - C. Ultrasound
 - D. Mammography✓ **Answer: B. MRI**
- **1172. The spinal canal is visible on:**
 - A. Pelvis AP
 - B. Lateral spine X-ray
 - C. Chest X-ray
 - D. Skull PA✓ **Answer: B. Lateral spine X-ray**
- **1173. Which structure lies in the anterior cranial fossa?**
 - A. Cerebellum
 - B. Frontal lobes
 - C. Medulla
 - D. Pons✓ **Answer: B. Frontal lobes**
- **1174. The pituitary gland is best seen in which imaging view?**
 - A. Chest PA
 - B. Lateral skull
 - C. AP lumbar
 - D. KUB✓ **Answer: B. Lateral skull**
- **1175. In spinal radiography, the intervertebral foramen is seen in:**
 - A. AP view
 - B. Lateral view
 - C. Oblique view
 - D. PA view✓ **Answer: C. Oblique view**
- **1176. The brainstem includes all EXCEPT:**
 - A. Midbrain
 - B. Pons
 - C. Medulla
 - D. Cerebellum✓ **Answer: D. Cerebellum**



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- **1177. CT of the brain is indicated for all EXCEPT:**

- A. Stroke
- B. Head trauma
- C. Foreign body in eye
- D. Intracranial hemorrhage

✓ **Answer: C. Foreign body in eye**

- **1178. The term “cauda equina” refers to:**

- A. Brain stem
- B. Spinal nerves below L1
- C. Corpus callosum
- D. Pituitary

✓ **Answer: B. Spinal nerves below L1**

- **1179. MRI T2-weighted images show CSF as:**

- A. Dark
- B. Bright
- C. Gray
- D. Invisible

✓ **Answer: B. Bright**

- **1180. A demyelinating disease affecting CNS is:**

- A. TB
- B. Multiple sclerosis
- C. ALS
- D. Parkinson's

✓ **Answer: B. Multiple sclerosis**

-

- **Section G: Endocrine System**

- **1181. The gland known as the "master gland" is the:**

- A. Thyroid
- B. Pituitary
- C. Adrenal



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D. Pineal

✓ **Answer: B. Pituitary**

- **1182. The thyroid gland is located anterior to which structure?**

A. Trachea

B. Esophagus

C. Spinal cord

D. Aorta

✓ **Answer: A. Trachea**

- **1183. Enlargement of the thyroid gland is known as:**

A. Goiter

B. Tumor

C. Hyperplasia

D. Adenoma

✓ **Answer: A. Goiter**

- **1184. The adrenal glands are located:**

A. Inside the kidneys

B. Superior to the kidneys

C. Behind the ureters

D. Within the liver

✓ **Answer: B. Superior to the kidneys**

- **1185. Hormones produced by adrenal medulla include:**

A. Cortisol

B. Estrogen

C. Epinephrine and norepinephrine

D. Thyroxine

✓ **Answer: C. Epinephrine and norepinephrine**

- **1186. The pineal gland is located in the:**

A. Frontal lobe

B. Cerebellum

C. Epithalamus

D. Medulla

✓ **Answer: C. Epithalamus**

- **1187. The hormone insulin is secreted by:**

A. Liver

B. Stomach

C. Pancreas (beta cells)

D. Kidney

✓ **Answer: C. Pancreas (beta cells)**



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- **1188. Parathyroid glands are located:**
 - A. Above the kidneys
 - B. Behind the thyroid
 - C. In the brainstem
 - D. At the aortic arch✓ **Answer: B. Behind the thyroid**
- **1189. Radiographic evaluation of thyroid is typically done with:**
 - A. MRI
 - B. Ultrasound or Nuclear Medicine (thyroid scan)
 - C. CT
 - D. Fluoroscopy✓ **Answer: B. Ultrasound or Nuclear Medicine (thyroid scan)**
- **1190. Addison's disease is due to failure of which gland?**
 - A. Pituitary
 - B. Adrenal cortex
 - C. Thyroid
 - D. Pancreas✓ **Answer: B. Adrenal cortex**

- **Section H: Male Reproductive System**

- **1191. The primary reproductive organ in males is:**
 - A. Penis
 - B. Seminal vesicle
 - C. Testis
 - D. Prostate✓ **Answer: C. Testis**
- **1192. The prostate gland is best visualized by:**
 - A. CT abdomen
 - B. Transrectal ultrasound
 - C. Skull X-ray
 - D. Chest CT✓ **Answer: B. Transrectal ultrasound**
- **1193. The vas deferens connects:**
 - A. Epididymis to urethra
 - B. Bladder to urethra
 - C. Seminal vesicle to rectum
 - D. Kidney to ureter✓ **Answer: A. Epididymis to urethra**



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- **1194. The scrotal contents are best evaluated using:**
 - A. Mammography
 - B. CT
 - C. Ultrasound
 - D. MRI

✓Answer: C. Ultrasound
- **1195. Prostate enlargement can cause:**
 - A. Kidney failure
 - B. Urinary obstruction
 - C. Pneumothorax
 - D. Infertility only

✓Answer: B. Urinary obstruction
- ---
- **Section I: Female Reproductive System**
- **1196. The uterus is located between the:**
 - A. Bladder and rectum
 - B. Kidney and spleen
 - C. Liver and stomach
 - D. Spine and pubis

✓Answer: A. Bladder and rectum
- **1197. Which imaging modality is most commonly used in pelvic gynecology?**
 - A. X-ray
 - B. Ultrasound
 - C. Fluoroscopy
 - D. CT

✓Answer: B. Ultrasound
- **1198. The endometrium is the:**
 - A. Muscle layer of the uterus
 - B. Outer lining of the bladder
 - C. Inner lining of the uterus
 - D. Membrane covering ovaries

✓Answer: C. Inner lining of the uterus
- **1199. The fallopian tubes connect:**
 - A. Urethra to vagina
 - B. Ovaries to uterus
 - C. Bladder to uterus
 - D. Kidney to uterus

✓Answer: B. Ovaries to uterus



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- **1200. A common radiologic procedure to evaluate uterine tubes is:**
 - A. IVP
 - B. Hysterosalpingography (HSG)
 - C. VCUG
 - D. CT urography

✓ **Answer: B. Hysterosalpingography (HSG)**
-

• Dual-Energy CT –

- **Basics & Physics of Dual-Energy CT**
- **1201. Dual-energy CT (DECT) uses two different:**
 - A. kVp levels
 - B. mA settings
 - C. Scan times
 - D. Gantry speeds

✓ **Answer: A. kVp levels**
- **1202. The most common dual-energy combinations are:**
 - A. 40 kVp and 100 kVp
 - B. 80 kVp and 140 kVp
 - C. 60 kVp and 110 kVp
 - D. 100 kVp and 160 kVp

✓ **Answer: B. 80 kVp and 140 kVp**
- **1203. DECT is primarily used to differentiate materials based on:**
 - A. Shape
 - B. Location
 - C. Atomic number (Z) and attenuation differences
 - D. Tissue temperature

✓ **Answer: C. Atomic number (Z) and attenuation differences**
- **1204. Dual-energy CT helps in generating:**
 - A. Standard grayscale images only
 - B. Dual-acquisition bone scans
 - C. Material-specific and virtual monoenergetic images
 - D. Ultrasound overlays

✓ **Answer: C. Material-specific and virtual monoenergetic images**



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- **1205. Which of the following detectors is essential in DECT?**
 - A. Gas-filled detectors
 - B. Flat panel detectors
 - C. Energy-sensitive (spectral) detectors
 - D. Photodiodes

✓ **Answer: C. Energy-sensitive (spectral) detectors**
- **1206. The attenuation coefficient of iodine varies with:**
 - A. Energy levels (kVp)
 - B. Scan time
 - C. Pixel matrix
 - D. Focal spot size

✓ **Answer: A. Energy levels (kVp)**
- **1207. Dual-energy CT can be performed using all EXCEPT:**
 - A. Dual-source CT
 - B. Rapid kVp switching
 - C. Dual-layer detectors
 - D. Single-energy scanner with interpolation

✓ **Answer: D. Single-energy scanner with interpolation**
- **1208. Virtual non-contrast images can be created in DECT by:**
 - A. Magnetic resonance simulation
 - B. Subtracting iodine maps
 - C. Multiplying raw data
 - D. Lowering mAs

✓ **Answer: B. Subtracting iodine maps**
- **1209. What is the advantage of virtual monoenergetic imaging (VMI)?**
 - A. Improves spatial resolution only
 - B. Removes scatter
 - C. Reduces beam-hardening artifacts and enhances contrast
 - D. Increases noise

✓ **Answer: C. Reduces beam-hardening artifacts and enhances contrast**
- **1210. Which of the following is a drawback of DECT?**
 - A. Poor soft tissue resolution
 - B. High dose in some systems
 - C. No iodine detection
 - D. Not useful in oncology

✓ **Answer: B. High dose in some systems**
- **1211. One benefit of DECT in renal stone evaluation is:**
 - A. Detecting soft tissue masses
 - B. Differentiating uric acid from calcium stones



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- C. Avoiding IV contrast
- D. Visualizing tumors
- ✓ **Answer: B. Differentiating uric acid from calcium stones**
- **1212. DECT improves diagnosis of gout by:**
 - A. Enhancing joint movement
 - B. Suppressing soft tissue
 - C. Detecting urate crystals
 - D. Showing fluid levels✓ **Answer: C. Detecting urate crystals**
- **1213. DECT iodine maps are especially useful in evaluating:**
 - A. Bone fractures
 - B. Fatty liver
 - C. Tumor perfusion
 - D. Air embolism✓ **Answer: C. Tumor perfusion**
- **1214. Which acquisition mode is NOT used in dual-energy CT?**
 - A. Dual-source
 - B. Sequential dual scan
 - C. Single-source fast kVp switching
 - D. Cone-beam interpolation✓ **Answer: D. Cone-beam interpolation**
- **1215. Virtual unenhanced imaging by DECT can reduce the need for:**
 - A. MRI
 - B. Radiation dose from true unenhanced scans
 - C. PET scans
 - D. Biopsy✓ **Answer: B. Radiation dose from true unenhanced scans**
- **1216. In dual-layer detector DECT, energy separation is achieved by:**
 - A. Source modulation
 - B. Time switching
 - C. Detector stack filters photons
 - D. Focal spot shift✓ **Answer: C. Detector stack filters photons**
- **1217. Bone removal in CT angiography using DECT is based on:**
 - A. Edge detection
 - B. Bone density measurement
 - C. Material decomposition
 - D. Subtraction imaging✓ **Answer: C. Material decomposition**



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- **1218. DECT has been proven useful in which trauma evaluation?**
 - A. Liver trauma grading
 - B. Bowel obstruction
 - C. Brain infarct
 - D. Active hemorrhage detection

✓ **Answer: D. Active hemorrhage detection**
- **1219. Which statement is TRUE about virtual monoenergetic images (VMI)?**
 - A. Always show reduced contrast
 - B. Appear identical at all energy levels
 - C. Can be optimized for noise and contrast by adjusting keV
 - D. Are same as standard images

✓ **Answer: C. Can be optimized for noise and contrast by adjusting keV**
- **1220. DECT helps reduce metal artifacts by using:**
 - A. High noise scans
 - B. Monoenergetic imaging around 70–140 keV
 - C. Contrast timing delay
 - D. Narrow pitch

✓ **Answer: B. Monoenergetic imaging around 70–140 keV**
- **1221. The term “spectral CT” is synonymous with:**
 - A. MRI spectroscopy
 - B. DECT
 - C. Ultrasound elastography
 - D. Gamma camera imaging

✓ **Answer: B. DECT**
- **1222. One key application of DECT in pulmonary embolism (PE) is:**
 - A. Lung biopsy
 - B. Lung volume estimation
 - C. Perfused blood volume (PBV) mapping
 - D. Bronchial mapping

✓ **Answer: C. Perfused blood volume (PBV) mapping**
- **1223. Which dual-energy mode offers best temporal resolution?**
 - A. Sequential scan
 - B. Dual-source CT
 - C. Slow kVp switching
 - D. Spiral mode

✓ **Answer: B. Dual-source CT**
- **1224. Gout crystals appear in DECT color overlays as:**
 - A. Red
 - B. Green



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- C. Blue or green (depending on vendor)
- D. White
- ✓ **Answer: C. Blue or green (depending on vendor)**
- **1225. Which of the following is an example of a high-Z element used in DECT analysis?**
 - A. Hydrogen
 - B. Nitrogen
 - C. Iodine
 - D. Carbon✓ **Answer: C. Iodine**
- **1226. A common post-processing technique in DECT to identify different materials is:**
 - A. Maximum intensity projection
 - B. Histogram equalization
 - C. Material decomposition
 - D. Volume rendering✓ **Answer: C. Material decomposition**
- **1227. Dual-energy CT is advantageous in CT angiography because it can:**
 - A. Avoid contrast
 - B. Perform time-resolved scans
 - C. Remove bone and enhance vessels
 - D. Measure cardiac output✓ **Answer: C. Remove bone and enhance vessels**
- **1228. Which of the following DECT modes requires two separate X-ray tubes?**
 - A. Dual-layer detector
 - B. Fast kVp switching
 - C. Dual-source scanner
 - D. Iterative reconstruction✓ **Answer: C. Dual-source scanner**
- **1229. Which type of reconstruction is most useful for identifying subtle fractures using DECT?**
 - A. VMI at low keV
 - B. Standard filtered back projection
 - C. Lung window axial image
 - D. Maximum intensity projection✓ **Answer: A. VMI at low keV**
- **1230. Compared to standard CT, DECT provides better detection of:**
 - A. Skin lesions



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- B. Bone fractures
- C. Differentiation between iodine and calcium
- D. Cardiac rhythm
- ✓ **Answer: C. Differentiation between iodine and calcium**
- **1231. Iodine suppression in DECT is useful in creating:**
 - A. Bone-only images
 - B. Virtual unenhanced scans
 - C. 3D angiograms
 - D. Dual-phase studies✓ **Answer: B. Virtual unenhanced scans**
- **1232. The term "keV" in DECT refers to:**
 - A. Photon count
 - B. X-ray power
 - C. Effective energy of photons
 - D. Scan duration✓ **Answer: C. Effective energy of photons**
- **1233. Which DECT technique does NOT require two detectors?**
 - A. Dual-layer detector
 - B. Dual-source CT
 - C. Rapid kVp switching
 - D. Twin-beam scanning✓ **Answer: C. Rapid kVp switching**
- **1234. When evaluating lung perfusion using DECT, what map is generated?**
 - A. Brain perfusion
 - B. Iodine map
 - C. Calcium map
 - D. Fat suppression map✓ **Answer: B. Iodine map**
- **1235. Artifact reduction in DECT can be enhanced by:**
 - A. Increasing patient motion
 - B. Monoenergetic reconstructions at high keV
 - C. Decreasing mAs
 - D. Changing slice thickness✓ **Answer: B. Monoenergetic reconstructions at high keV**
- **1236. DECT helps detect GI bleeding by:**
 - A. Using tagged RBC
 - B. Showing iodine pooling in bowel
 - C. MR contrast



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- D. Gastric insufflation
✓ **Answer: B. Showing iodine pooling in bowel**
- **1237. A disadvantage of DECT with sequential scans is:**
 - A. Reduced spatial resolution
 - B. Increased motion artifacts
 - C. Slow tube current
 - D. Need for MRI overlay✓ **Answer: B. Increased motion artifacts**
- **1238. Virtual monoenergetic images are typically reconstructed from:**
 - A. Soft-tissue filters
 - B. DECT raw data
 - C. PACS archives
 - D. Standard images✓ **Answer: B. DECT raw data**
- **1239. Dual-energy imaging in head CT is useful for detecting:**
 - A. Air-fluid levels
 - B. Metal in eyes
 - C. Acute hemorrhage vs iodine contrast
 - D. Bone spurs✓ **Answer: C. Acute hemorrhage vs iodine contrast**
- **1240. Which organ benefits the MOST from virtual unenhanced imaging?**
 - A. Heart
 - B. Lungs
 - C. Liver
 - D. Gallbladder✓ **Answer: C. Liver**
- **1241. DECT dose compared to single-energy CT is generally:**
 - A. Always higher
 - B. Always lower
 - C. Similar or slightly higher depending on mode
 - D. Double✓ **Answer: C. Similar or slightly higher depending on mode**
- **1242. DECT calcium suppression is used in:**
 - A. Myelography
 - B. Renal colic
 - C. Bone marrow biopsy
 - D. Cardiac CT to suppress coronary calcifications✓ **Answer: D. Cardiac CT to suppress coronary calcifications**



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- **1243. Which vendor-specific DECT technology uses a layered detector?**
 - A. Siemens Dual-source
 - B. GE Fast kVp switching
 - C. Philips IQon
 - D. Toshiba Area Detector

✓ **Answer: C. Philips IQon**
- **1244. Which vendor uses gemstone detectors for DECT?**
 - A. Canon
 - B. GE
 - C. Siemens
 - D. Hitachi

✓ **Answer: B. GE**
- **1245. The term “material-specific image” in DECT means:**
 - A. Uniform grayscale
 - B. Energy-matched attenuation
 - C. Reconstructed map isolating a substance (e.g., iodine, calcium, urate)
 - D. 3D VR image

✓ **Answer: C. Reconstructed map isolating a substance (e.g., iodine, calcium, urate)**
- **1246. A challenge with DECT in clinical practice is:**
 - A. Too many images to store and review
 - B. Excessive artifacts
 - C. Low temporal resolution
 - D. Cost of film

✓ **Answer: A. Too many images to store and review**
- **1247. In DECT, color-coded gout maps help distinguish urate deposits from:**
 - A. Air pockets
 - B. Cartilage
 - C. Calcium
 - D. Protein

✓ **Answer: C. Calcium**
- **1248. In oncology, DECT helps monitor:**
 - A. Airway disease
 - B. Iodine perfusion of tumors
 - C. Renal artery stenosis
 - D. Bone density only

✓ **Answer: B. Iodine perfusion of tumors**
- **1249. DECT’s virtual monoenergetic images can be tuned to optimize:**
 - A. Scan time
 - B. Gantry tilt



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C. Contrast-to-noise ratio (CNR)

D. Table movement

✓ **Answer: C. Contrast-to-noise ratio (CNR)**

- **1250. One advantage of using low-keV VMI in DECT is:**

A. Sharper bone edges

B. Enhanced iodine contrast

C. Better lung air interface

D. Reduced motion

✓ **Answer: B. Enhanced iodine contrast**

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• **PET-MRI Principles & Instrumentation**

- **1251. PET-MRI is a hybrid modality combining:**

A. Functional ultrasound with CT

B. PET and MRI imaging capabilities

C. CT and SPECT

D. Radiography and mammography

✓ **Answer: B. PET and MRI imaging capabilities**

- **1252. PET-MRI systems provide the advantage of:**

A. Bone imaging

B. Simultaneous anatomical and metabolic data

C. High-dose radiation

D. Static imaging

✓ **Answer: B. Simultaneous anatomical and metabolic data**

- **1253. One major challenge in PET-MRI is:**

A. Poor MRI resolution

B. Attenuation correction

C. Absence of contrast agents

D. Limited soft tissue visualization

✓ **Answer: B. Attenuation correction**

- **1254. In PET-MRI, MRI is primarily used for:**

A. Calculating SUV

B. Soft tissue contrast and attenuation correction

C. Scanning bones

D. Radiation generation

✓ **Answer: B. Soft tissue contrast and attenuation correction**

- **1255. Which radiotracer is commonly used in PET-MRI?**

A. Iodine-123

B. Fluorodeoxyglucose (FDG)



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C. Technetium-99m

D. Gadolinium

✓ **Answer: B. Fluorodeoxyglucose (FDG)**

- **1256. What type of MRI sequence is typically used for attenuation correction in PET-MRI?**

A. T1-weighted

B. Dixon sequence

C. Diffusion sequence

D. T2-FLAIR

✓ **Answer: B. Dixon sequence**

- **1257. The MRI component in PET-MRI assists with:**

A. Bone mapping

B. Tumor perfusion analysis

C. Soft tissue localization and segmentation

D. Gamma emission

✓ **Answer: C. Soft tissue localization and segmentation**

- **1258. Simultaneous PET-MRI scanning allows for:**

A. Shorter scan time

B. Better fusion accuracy

C. Lower spatial resolution

D. Reduced metabolic data

✓ **Answer: B. Better fusion accuracy**

- **1259. MRI-compatible PET detectors are typically made of:**

A. Lead

B. LSO or LYSO crystals + SiPMs

C. Sodium iodide

D. Gas chambers

✓ **Answer: B. LSO or LYSO crystals + SiPMs**

- **1260. A major clinical benefit of PET-MRI over PET-CT is:**

A. Faster scan time

B. Lower radiation dose

C. Bone detail

D. No attenuation issues

✓ **Answer: B. Lower radiation dose**

- **1261. PET-MRI is most suitable for imaging:**

A. Lung nodules

B. Liver fibrosis

C. Soft tissue tumors and brain lesions



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- D. Bone density
✓ **Answer: C. Soft tissue tumors and brain lesions**
- **1262. Time-of-flight (TOF) in PET-MRI helps with:**
 - A. Reducing motion
 - B. Enhancing image contrast
 - C. Improving spatial localization of annihilation events
 - D. Correcting MR artifacts✓ **Answer: C. Improving spatial localization of annihilation events**
- **1263. MRI contrast agents used in PET-MRI include:**
 - A. Iodinated contrast
 - B. Gadolinium-based agents
 - C. FDG
 - D. Barium✓ **Answer: B. Gadolinium-based agents**
- **1264. FDG uptake is directly related to:**
 - A. Water diffusion
 - B. Blood calcium
 - C. Glucose metabolism
 - D. Gadolinium concentration✓ **Answer: C. Glucose metabolism**
- **1265. What is a key advantage of SiPM detectors in PET-MRI systems?**
 - A. High voltage requirement
 - B. Magnetic field insensitivity
 - C. High radiation dose
 - D. Poor timing resolution✓ **Answer: B. Magnetic field insensitivity**
- **1266. The primary limitation of PET-MRI in the thorax is:**
 - A. Image brightness
 - B. Attenuation correction due to lung air
 - C. Inability to detect fat
 - D. Bone overexposure✓ **Answer: B. Attenuation correction due to lung air**
- **1267. Which clinical field benefits most from PET-MRI?**
 - A. Orthopedics
 - B. Neurology and oncology
 - C. Cardiology only
 - D. Obstetrics✓ **Answer: B. Neurology and oncology**



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- **1268. Attenuation correction in PET-MRI lacks representation of:**
 - A. Air
 - B. Water
 - C. Bone
 - D. Liver✓ **Answer: C. Bone**
- **1269. PET-MRI hybrid scanners are typically:**
 - A. Side-by-side only
 - B. Integrated (simultaneous acquisition)
 - C. PET-first only
 - D. Rotating gantry models✓ **Answer: B. Integrated (simultaneous acquisition)**
- **1270. MR-based motion correction in PET-MRI is achieved using:**
 - A. T2-weighted scans
 - B. Gating techniques and cine sequences
 - C. CT overlay
 - D. Contrast bolus tracking✓ **Answer: B. Gating techniques and cine sequences**
- **1271. Which of the following is TRUE about radiation dose in PET-MRI?**
 - A. Higher than PET-CT
 - B. Equal to CT
 - C. Lower than PET-CT
 - D. Same as fluoroscopy✓ **Answer: C. Lower than PET-CT**
- **1272. PET-MRI avoids CT-induced artifacts from:**
 - A. Gadolinium
 - B. Air in lungs
 - C. Metal implants
 - D. Contrast washout✓ **Answer: C. Metal implants**
- **1273. Which PET tracer is often used in neuro-oncology PET-MRI?**
 - A. FDG
 - B. F-DOPA
 - C. Tc-99m MDP
 - D. I-131✓ **Answer: B. F-DOPA**
- **1274. PET-MRI image fusion helps in:**
 - A. Radiation therapy planning
 - B. Reducing noise



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C. Eliminating MRI sequences

D. Discarding metabolic data

✓**Answer: A. Radiation therapy planning**

- **1275. Hybrid PET-MRI systems are primarily used in which imaging center types?**

A. Mobile X-ray vans

B. Orthopedic clinics

C. High-end research and tertiary oncology/neurology centers

D. Primary health posts

✓**Answer: C. High-end research and tertiary oncology/neurology centers**

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Clinical Applications & Image Quality in PET-MRI

- **1276. PET-MRI provides superior diagnostic accuracy in:**

A. Skin infections

B. Bone fractures

C. Brain tumors and soft tissue sarcomas

D. Pneumonia

✓**Answer: C. Brain tumors and soft tissue sarcomas**

- **1277. One major limitation of PET-MRI in lung imaging is:**

A. High spatial resolution

B. High sensitivity

C. Low attenuation correction in air-filled structures

D. Motion correction

✓**Answer: C. Low attenuation correction in air-filled structures**

- **1278. PET-MRI is highly valuable in pediatric oncology because:**

A. MRI is faster

B. MRI is cheaper

C. Radiation dose is minimized

D. PET is avoided

✓**Answer: C. Radiation dose is minimized**

- **1279. Which sequence helps correct for movement in PET-MRI?**

A. 3D TSE

B. Cine MRI

C. Gradient echo

D. Dixon fat-water

✓**Answer: B. Cine MRI**

- **1280. The most common use of PET-MRI in cardiology is to assess:**

A. Myocardial infarction using FDG



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- B. Valve disease
- C. Blood pressure
- D. Arrhythmia

✓ **Answer: A. Myocardial infarction using FDG**

- **1281. An ideal PET-MRI radiotracer for detecting prostate cancer is:**
 - A. Tc-99m
 - B. FDG
 - C. PSMA
 - D. Ga-67

✓ **Answer: C. PSMA**

- **1282. PET-MRI scanner shielding must consider:**
 - A. Gamma ray leakage
 - B. MRI magnetic fields
 - C. Ultrasound scatter
 - D. Optical reflection

✓ **Answer: B. MRI magnetic fields**

- **1283. Which type of attenuation correction is NOT needed in PET-MRI?**
 - A. Bone segmentation
 - B. Coil attenuation map
 - C. CT attenuation map
 - D. Soft tissue segmentation

✓ **Answer: C. CT attenuation map**

- **1284. Compared to PET-CT, PET-MRI has better resolution for:**
 - A. Calcified plaque
 - B. Bone tumors
 - C. Brain and liver lesions
 - D. Airway collapse

✓ **Answer: C. Brain and liver lesions**

- **1285. A common fusion challenge in PET-MRI is:**
 - A. Mismatched timing of scans
 - B. Radiation-induced artifacts
 - C. Non-contrast MRI
 - D. Contrast over-saturation

✓ **Answer: A. Mismatched timing of scans**

- **1286. MR-based attenuation correction does NOT account well for:**
 - A. Soft tissue
 - B. Fat
 - C. Air



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D. Bone

✓ **Answer: D. Bone**

- **1287. MR-compatible PET detectors must avoid:**

A. Gadolinium coating
B. Interference with magnetic fields
C. Using cryogenics
D. CT-based reconstruction

✓ **Answer: B. Interference with magnetic fields**

- **1288. In PET-MRI, artifact from MRI coils may result in:**

A. Beam hardening
B. False FDG uptake
C. Attenuation map errors
D. Metal scatter

✓ **Answer: C. Attenuation map errors**

- **1289. Attenuation correction maps in PET-MRI are called:**

A. SUV maps
B. U-maps
C. ADC maps
D. CNR maps

✓ **Answer: B. U-maps**

- **1290. PET-MRI is most often used in place of PET-CT in which patients?**

A. Elderly with stroke
B. Young cancer patients
C. Diabetic neuropathy
D. COPD

✓ **Answer: B. Young cancer patients**

- **1291. Fat suppression in MR sequences improves PET-MRI fusion by:**

A. Reducing magnetic field
B. Clarifying tissue borders
C. Enhancing bone detail
D. Boosting glucose uptake

✓ **Answer: B. Clarifying tissue borders**

- **1292. PET-MRI is advantageous in the head and neck because of:**

A. Skull contrast
B. Motion correction
C. Soft tissue contrast in small structures
D. Tracheal patency

✓ **Answer: C. Soft tissue contrast in small structures**



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- **1293. Motion correction in PET-MRI often uses:**
 - A. External markers
 - B. Cine loops and gating
 - C. Ventilators
 - D. CT pre-scans

✓ **Answer: B. Cine loops and gating**
- **1294. One limitation of MRI-based attenuation correction is:**
 - A. No effect on soft tissue
 - B. Cannot differentiate between air and metal
 - C. Adds radiation dose
 - D. Incomplete image reconstruction

✓ **Answer: B. Cannot differentiate between air and metal**
- **1295. One potential advantage of PET-MRI in epilepsy evaluation is:**
 - A. Enhanced metabolic and functional correlation
 - B. Detection of spinal injury
 - C. Early liver metastases
 - D. Measuring cardiac output

✓ **Answer: A. Enhanced metabolic and functional correlation**
- **1296. The term SUV in PET-MRI stands for:**
 - A. Standard uptake value
 - B. Signal uniformity value
 - C. Soft-tissue unification volume
 - D. Specific utility variable

✓ **Answer: A. Standard uptake value**
- **1297. PET-MRI produces lower artifacts compared to PET-CT in:**
 - A. Dental implants
 - B. Artificial joints
 - C. Pacemakers
 - D. Lung nodules

✓ **Answer: A. Dental implants**
- **1298. FDG uptake can be falsely elevated in PET due to:**
 - A. High contrast dose
 - B. Injection delay
 - C. Muscle activity or inflammation
 - D. Low keV

✓ **Answer: C. Muscle activity or inflammation**
- **1299. In PET-MRI, delayed imaging is useful for:**
 - A. Better soft tissue detail
 - B. Increasing radiation dose



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- C. Evaluating lymph nodes post-contrast
 - D. Ensuring clearance of artifacts
 - ✓ **Answer: C. Evaluating lymph nodes post-contrast**
 - **1300. Which combination best defines PET-MRI?**
 - A. Structural and anatomic imaging
 - B. Metabolic and functional imaging
 - C. Functional + high-resolution anatomical imaging
 - D. Radiation-only imaging
 - ✓ **Answer: C. Functional + high-resolution anatomical imaging**
-

CT Pathologies & Angiography –

CT Head Pathologies

1301. The most common CT appearance of acute intracerebral hemorrhage is:

- A. Hypodense area
 - B. Isoattenuating lesion
 - C. Hyperdense lesion
 - D. Ring enhancement
- ✓ **Answer: C. Hyperdense lesion**

1302. CT is preferred in stroke evaluation because it can:

- A. Detect early infarcts only
 - B. Rule out hemorrhage quickly
 - C. Always detect tumors
 - D. Replace MRI entirely
- ✓ **Answer: B. Rule out hemorrhage quickly**

1303. An ischemic stroke on non-contrast CT appears as:

- A. Hyperdense artery sign
 - B. Hypodense parenchyma
 - C. Ring-enhancing lesion
 - D. Hyperlucent cortex
- ✓ **Answer: B. Hypodense parenchyma**



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1304. The “dense MCA sign” on CT suggests:

- A. Calcified vessel
- B. MCA infarction
- C. Tumor
- D. Aneurysm

✓ **Answer: B. MCA infarction**

1305. Subarachnoid hemorrhage is best detected in the:

- A. Cortical sulci
- B. Posterior fossa
- C. Ventricles
- D. Basal cisterns

✓ **Answer: D. Basal cisterns**

1306. In a brain abscess, ring enhancement is best seen after:

- A. T2-weighted imaging
- B. Non-contrast CT
- C. Contrast-enhanced CT
- D. Perfusion study

✓ **Answer: C. Contrast-enhanced CT**

1307. A common CT feature of epidural hematoma is:

- A. Crescent shape
- B. Midline shift
- C. Lentiform (biconvex) shape
- D. Intraventricular bleed

✓ **Answer: C. Lentiform (biconvex) shape**

1308. Intraventricular hemorrhage is typically seen in:

- A. Acute stroke
- B. Head trauma
- C. Congenital malformation
- D. Alzheimer’s disease

✓ **Answer: B. Head trauma**

1309. Hydrocephalus is seen on CT as:

- A. Shrunken ventricles
- B. Dilated ventricles
- C. Midline calcification



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D. Periventricular nodules

✓**Answer: B. Dilated ventricles**

1310. Calcified pineal gland is considered:

A. Normal after age 20

B. Always abnormal

C. Indicator of stroke

D. Sign of meningitis

✓**Answer: A. Normal after age 20**

1311. A ring-enhancing lesion on contrast CT of the brain suggests:

A. Glioblastoma

B. Brain abscess

C. Metastasis

D. Any of the above

✓**Answer: D. Any of the above**

1312. Common site for hypertensive bleed in CT brain is:

A. Thalamus

B. Frontal lobe

C. Occipital cortex

D. Cerebellum

✓**Answer: A. Thalamus**

1313. The gray-white matter interface loss is a sign of:

A. Chronic infarct

B. Early ischemic stroke

C. Normal aging

D. Subdural hematoma

✓**Answer: B. Early ischemic stroke**

1314. CT is most sensitive for detecting blood in the brain within:

A. 48 hours

B. 6 hours

C. 72 hours

D. 1 week

✓**Answer: B. 6 hours**



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1315. Which CT scan phase is best for aneurysm detection?

- A. Non-contrast phase
- B. Delayed phase
- C. Arterial (angiographic) phase
- D. Venous phase

✓ **Answer: C. Arterial (angiographic) phase**

CT Chest Pathologies

1316. A CT finding of ‘ground-glass opacity’ suggests:

- A. Pleural effusion
- B. Early pneumonia or COVID-19
- C. Pneumothorax
- D. Pulmonary embolism

✓ **Answer: B. Early pneumonia or COVID-19**

1317. The “crazy paving” pattern on chest CT indicates:

- A. Pulmonary embolism
- B. Interstitial lung disease or COVID-19
- C. Asthma
- D. Pneumothorax

✓ **Answer: B. Interstitial lung disease or COVID-19**

1318. In pulmonary embolism, a classical CT sign is:

- A. Mosaic attenuation
- B. Filling defect in pulmonary artery
- C. Air bronchogram
- D. Honeycombing

✓ **Answer: B. Filling defect in pulmonary artery**

1319. The Westermark sign on CT chest indicates:

- A. Lung consolidation
- B. Pulmonary infarct
- C. Hyperlucency due to PE
- D. Hilar lymphadenopathy

✓ **Answer: C. Hyperlucency due to PE**



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1320. Cavitating lung lesion may indicate:

- A. Tuberculosis
- B. COPD
- C. PE
- D. Effusion

✓ **Answer: A. Tuberculosis**

1321. Lung nodules larger than 3 cm are classified as:

- A. Mass
- B. Calcification
- C. Atelectasis
- D. Bullae

✓ **Answer: A. Mass**

1322. A halo sign in CT chest suggests:

- A. Normal lung
- B. Invasive fungal infection
- C. Old healed TB
- D. Silicosis

✓ **Answer: B. Invasive fungal infection**

1323. In CT of COVID-19, bilateral GGO typically appears in the:

- A. Upper lobes
- B. Central zone
- C. Lower and peripheral lung zones
- D. Main bronchus

✓ **Answer: C. Lower and peripheral lung zones**

1324. Tree-in-bud appearance is associated with:

- A. Bronchiectasis
- B. Infective bronchiolitis (TB, atypical infections)
- C. Pulmonary fibrosis
- D. ARDS

✓ **Answer: B. Infective bronchiolitis (TB, atypical infections)**

1325. Lung consolidation on CT appears as:

- A. Ground-glass
- B. Air-filled black zone
- C. Solid white opacity obscuring vessels



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D. Ring sign

✓ **Answer: C. Solid white opacity obscuring vessels**

1326. Honeycombing on HRCT chest is indicative of:

A. Early infection

B. Bronchitis

C. End-stage pulmonary fibrosis

D. Empyema

✓ **Answer: C. End-stage pulmonary fibrosis**

1327. Mediastinal lymphadenopathy is seen in:

A. Pneumonia

B. Sarcoidosis, lymphoma, TB

C. Bronchitis

D. Asthma

✓ **Answer: B. Sarcoidosis, lymphoma, TB**

1328. The “air bronchogram” sign indicates:

A. Normal lungs

B. Cavitation

C. Consolidation or alveolar filling

D. Pleural effusion

✓ **Answer: C. Consolidation or alveolar filling**

1329. Which contrast phase is best to evaluate PE?

A. Non-contrast

B. Arterial (pulmonary angiographic phase)

C. Delayed phase

D. Venous phase

✓ **Answer: B. Arterial (pulmonary angiographic phase)**

1330. Pleural effusion on CT is best seen as:

A. Low-density fluid collection in dependent regions

B. High attenuation cortex

C. Calcified rim

D. Solid lung opacity

✓ **Answer: A. Low-density fluid collection in dependent regions**



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CT Angiography – Brain, Aorta, Pulmonary

1331. CT Angiography (CTA) is used for evaluating:

- A. Bones
- B. Vascular structures
- C. Fatty liver
- D. Intestines

✓ **Answer: B. Vascular structures**

1332. Aortic dissection is best diagnosed using:

- A. CT abdomen
- B. MRI
- C. CT Angiography (CTA)
- D. Ultrasound

✓ **Answer: C. CT Angiography (CTA)**

1333. Stanford type A aortic dissection involves:

- A. Descending aorta
- B. Ascending aorta ± arch
- C. Iliac arteries
- D. Abdominal aorta only

✓ **Answer: B. Ascending aorta ± arch**

1334. A “double lumen” sign on CTA indicates:

- A. PE
- B. Dissection
- C. Tumor
- D. Arterial thrombosis

✓ **Answer: B. Dissection**

1335. Circle of Willis aneurysms are best seen on:

- A. Plain CT
- B. CT Angiography of brain
- C. CT perfusion
- D. MR venography

✓ **Answer: B. CT Angiography of brain**

1336. Pulmonary CTA is performed to diagnose:

- A. ARDS



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- B. COPD
- C. Pulmonary embolism
- D. Lung cancer
- ✓ **Answer: C. Pulmonary embolism**

1337. An intramural hematoma on aortic CTA appears as:

- A. Intimal flap
- B. Crescent-shaped hyperdensity
- C. Mass
- D. Hypodense plaque
- ✓ **Answer: B. Crescent-shaped hyperdensity**

1338. The 'triple rule out' CTA protocol evaluates:

- A. Brain, spine, and abdomen
- B. Heart, aorta, and pulmonary arteries
- C. Liver, spleen, kidney
- D. Thyroid, trachea, esophagus
- ✓ **Answer: B. Heart, aorta, and pulmonary arteries**

1339. Contrast timing for pulmonary CTA is achieved using:

- A. Bolus tracking in the ascending aorta
- B. Bolus tracking in main pulmonary artery
- C. Fixed delay
- D. None of the above
- ✓ **Answer: B. Bolus tracking in main pulmonary artery**

1340. Which phase is best for coronary CTA?

- A. Early arterial
- B. Mid-diastole ECG-gated phase
- C. Venous phase
- D. Portal venous phase
- ✓ **Answer: B. Mid-diastole ECG-gated phase**

1341. Venous thrombosis in cerebral veins is best evaluated by:

- A. MR T1
- B. CT venography
- C. Plain X-ray
- D. USG
- ✓ **Answer: B. CT venography**



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1342. “Beak sign” on CTA indicates:

- A. Tumor
- B. Vessel rupture
- C. Arterial dissection
- D. Stenosis

✓ **Answer: C. Arterial dissection**

1343. Aneurysmal rupture often leads to:

- A. Hydrocephalus
- B. Subarachnoid hemorrhage
- C. Infarct
- D. Stroke

✓ **Answer: B. Subarachnoid hemorrhage**

1344. Most common site of aneurysm in CTA brain is:

- A. ACA
- B. MCA
- C. ACom (anterior communicating artery)
- D. PCA

✓ **Answer: C. ACom (anterior communicating artery)**

1345. CT angiography contrast media used is usually:

- A. Barium
- B. Gadolinium
- C. Iodinated contrast
- D. None

✓ **Answer: C. Iodinated contrast**

1346. Contrast extravasation in CTA indicates:

- A. Thrombosis
- B. Ruptured aneurysm or active bleeding
- C. Vasospasm
- D. Embolism

✓ **Answer: B. Ruptured aneurysm or active bleeding**

1347. Vascular stenosis is diagnosed by:

- A. Bone window
- B. Lung algorithm
- C. CTA showing >50% narrowing



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D. Plain film

✓ **Answer: C. CTA showing >50% narrowing**

1348. CT angiography of coronary arteries requires:

A. Heart rate <65 bpm

B. High mAs

C. No contrast

D. Prone position

✓ **Answer: A. Heart rate <65 bpm**

1349. The “string of beads” sign on CTA suggests:

A. Fibromuscular dysplasia

B. Atherosclerosis

C. Vasculitis

D. Infarct

✓ **Answer: A. Fibromuscular dysplasia**

1350. Peripheral arterial disease (PAD) is best evaluated by:

A. CT angiography of lower limbs

B. Non-contrast CT

C. X-ray

D. IVP

✓ **Answer: A. CT angiography of lower limbs**

- **CT Venography**

- **1351. CT Venography (CTV) is primarily used to detect:**

- A. Arterial occlusion

- B. Deep vein thrombosis (DVT)

- C. Arteritis

- D. Lung nodules

- ✓ **Answer: B. Deep vein thrombosis (DVT)**



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- **1352. The most common site evaluated in lower limb CTV is the:**
 - A. Femoral vein
 - B. Saphenous vein
 - C. Iliac vein
 - D. Popliteal vein

✓ **Answer: A. Femoral vein**
- **1353. Timing of contrast for CTV is typically in the:**
 - A. Early arterial phase
 - B. Portal venous phase
 - C. Delayed venous phase (~180 sec)
 - D. Non-contrast phase

✓ **Answer: C. Delayed venous phase (~180 sec)**
- **1354. CT Venography of the brain is used to detect:**
 - A. Ischemic stroke
 - B. Aneurysm
 - C. Cerebral venous sinus thrombosis (CVST)
 - D. Encephalitis

✓ **Answer: C. Cerebral venous sinus thrombosis (CVST)**
- **1355. The 'empty delta sign' in contrast-enhanced CT indicates:**
 - A. Arterial spasm
 - B. Normal sinus
 - C. Superior sagittal sinus thrombosis
 - D. Tumor

✓ **Answer: C. Superior sagittal sinus thrombosis**
- **1356. CTV head is useful in patients with:**
 - A. Hemiplegia only
 - B. Sinus headache
 - C. Seizures + raised ICP with no hemorrhage on NCCT
 - D. Alzheimer's disease

✓ **Answer: C. Seizures + raised ICP with no hemorrhage on NCCT**
- **1357. Which contrast is used in CTV?**
 - A. Oral barium
 - B. Gadolinium
 - C. Iodinated contrast (IV)
 - D. None

✓ **Answer: C. Iodinated contrast (IV)**
- **1358. Delay in scanning during CTV allows:**
 - A. Arterial opacification
 - B. Bone removal



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C. Venous enhancement

D. Lower radiation

✓**Answer: C. Venous enhancement**

- **1359. CTV is better than Doppler ultrasound in detecting DVT in:**

A. Calf veins

B. Pelvic and iliac veins

C. Ankle

D. Neck veins

✓**Answer: B. Pelvic and iliac veins**

- **1360. Advantage of CT venography over MRV is:**

A. No contrast required

B. Better soft tissue contrast

C. Faster and more widely available

D. No radiation

✓**Answer: C. Faster and more widely available**

- **1361. Post-thrombotic scarring on CTV appears as:**

A. Filling defect

B. Venous narrowing or wall thickening

C. Complete enhancement

D. No change

✓**Answer: B. Venous narrowing or wall thickening**

- **1362. CT venography of SVC is helpful in diagnosing:**

A. Dextrocardia

B. Pulmonary TB

C. SVC syndrome

D. Valve regurgitation

✓**Answer: C. SVC syndrome**

- **1363. Venous collaterals seen on CTV in chronic DVT suggest:**

A. Acute occlusion

B. Normal findings

C. Chronic obstruction

D. Active bleeding

✓**Answer: C. Chronic obstruction**

- **1364. The "cord sign" in CVT on CTV is due to:**

A. Enhanced normal sinus

B. Hyperdensity of thrombosed vein

C. Air embolism

D. Ischemia

✓**Answer: B. Hyperdensity of thrombosed vein**



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- **1365. The most common dural sinus involved in CVST is:**
 - A. Transverse sinus
 - B. Cavernous sinus
 - C. Superior sagittal sinus
 - D. Straight sinus

✓ **Answer: C. Superior sagittal sinus**
- ---
- **CT Perfusion**
- **1366. CT perfusion (CTP) evaluates:**
 - A. Blood vessel diameter
 - B. Perfusion parameters of tissues (CBV, CBF, MTT)
 - C. Bone density
 - D. Lung fibrosis

✓ **Answer: B. Perfusion parameters of tissues (CBV, CBF, MTT)**
- **1367. CBV stands for:**
 - A. Central blood volume
 - B. Circulatory brain vessel
 - C. Cerebral blood volume
 - D. Capillary blood volume

✓ **Answer: C. Cerebral blood volume**
- **1368. Decreased CBF and increased MTT indicates:**
 - A. Tumor
 - B. Hemorrhage
 - C. Ischemic penumbra
 - D. Normal perfusion

✓ **Answer: C. Ischemic penumbra**
- **1369. CT perfusion is commonly used in:**
 - A. Trauma
 - B. Acute stroke evaluation
 - C. Lung nodule biopsy
 - D. Liver cysts

✓ **Answer: B. Acute stroke evaluation**
- **1370. CTP is most accurate when performed within:**
 - A. 6–8 hours of symptom onset
 - B. After 24 hours
 - C. At any time
 - D. 10 minutes

✓ **Answer: A. 6–8 hours of symptom onset**



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- **1371. Mean transit time (MTT) measures:**
 - A. Number of vessels
 - B. Time for contrast to pass through tissue
 - C. Stroke volume
 - D. Vascular resistance

✓ **Answer: B. Time for contrast to pass through tissue**
- **1372. In CT perfusion, infarct core is characterized by:**
 - A. Low CBV, low CBF
 - B. High CBV
 - C. High CBF, low MTT
 - D. Normal perfusion

✓ **Answer: A. Low CBV, low CBF**
- **1373. Advantage of CTP over plain CT in stroke is:**
 - A. Detecting early infarcts
 - B. Identifying viable penumbra
 - C. Better resolution
 - D. Low cost

✓ **Answer: B. Identifying viable penumbra**
- **1374. CTP in oncology helps assess:**
 - A. Tumor perfusion and angiogenesis
 - B. Edema
 - C. Cyst formation
 - D. Pleural effusion

✓ **Answer: A. Tumor perfusion and angiogenesis**
- **1375. Which pathology shows increased perfusion on CTP?**
 - A. Stroke core
 - B. Tumor or inflammation
 - C. Old infarct
 - D. Chronic calcification

✓ **Answer: B. Tumor or inflammation**
- **1376. Deconvolution algorithms in CTP are used for:**
 - A. Image enhancement
 - B. Perfusion parameter calculation
 - C. Radiation control
 - D. Dose estimation

✓ **Answer: B. Perfusion parameter calculation**
- **1377. CTP maps are prone to errors from:**
 - A. Motion artifacts
 - B. Bone window settings



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- C. High mAs
- D. Detector pitch
- ✓ **Answer: A. Motion artifacts**
- **1378. High perfusion in liver tumors on CTP suggests:**
 - A. Necrosis
 - B. High vascularity (HCC)
 - C. Cyst
 - D. Fibrosis✓ **Answer: B. High vascularity (HCC)**
- **1379. CT perfusion is usually followed by:**
 - A. PET scan
 - B. CT angiography
 - C. MRI
 - D. X-ray✓ **Answer: B. CT angiography**
- **1380. Limitation of CTP includes:**
 - A. No radiation
 - B. Costly contrast
 - C. Radiation dose and limited coverage area
 - D. High-resolution imaging✓ **Answer: C. Radiation dose and limited coverage area**
- ---
- **CT Abdomen & Pelvis Pathologies**
- **1381. Acute appendicitis on CT appears as:**
 - A. Collapsed bowel
 - B. Dilated appendix >6mm with wall thickening
 - C. Hypodense spleen
 - D. Hyperdense kidney✓ **Answer: B. Dilated appendix >6mm with wall thickening**
- **1382. Pancreatitis shows what sign on CT?**
 - A. Hypodense lesion in liver
 - B. Fat stranding and swollen pancreas
 - C. Splenomegaly
 - D. Ureteral stone✓ **Answer: B. Fat stranding and swollen pancreas**
- **1383. CT sign of diverticulitis is:**
 - A. Bowel wall thinning
 - B. Pericolonic fat stranding and diverticula



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- C. Gallstone
- D. Lymphadenopathy
- ✓ **Answer: B. Pericolonic fat stranding and diverticula**
- **1384. CT finding in acute cholecystitis:**
 - A. Collapsed gallbladder
 - B. Gallbladder wall thickening + pericholecystic fluid
 - C. Ureteric stone
 - D. Gastritis✓ **Answer: B. Gallbladder wall thickening + pericholecystic fluid**
- **1385. Best phase for detecting liver metastasis on CT:**
 - A. Non-contrast
 - B. Arterial phase
 - C. Portal venous phase
 - D. Delayed phase✓ **Answer: C. Portal venous phase**
- **1386. CT finding of liver hemangioma is:**
 - A. Calcified cyst
 - B. Early peripheral nodular enhancement
 - C. Central necrosis
 - D. Fat stranding✓ **Answer: B. Early peripheral nodular enhancement**
- **1387. Renal stones appear on CT as:**
 - A. Hypodense shadow
 - B. Hyperdense focus without contrast
 - C. Enhancing lesion
 - D. Cystic area✓ **Answer: B. Hyperdense focus without contrast**
- **1388. Hydronephrosis is indicated by:**
 - A. Shrunken kidney
 - B. Dilated pelvicalyceal system
 - C. Hypodense adrenal gland
 - D. Splenic calcification✓ **Answer: B. Dilated pelvicalyceal system**
- **1389. CT sign of perforated hollow viscus is:**
 - A. Dilated loops
 - B. Ascites
 - C. Pneumoperitoneum (free air under diaphragm)
 - D. Wall thickening✓ **Answer: C. Pneumoperitoneum (free air under diaphragm)**



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- **1390. CT appearance of pelvic abscess:**
 - A. Calcified lesion
 - B. Low-density fluid with enhancing rim
 - C. High-density fat
 - D. Gasless abdomen

✓ **Answer: B. Low-density fluid with enhancing rim**
- **1391. Bowel obstruction on CT is suggested by:**
 - A. Collapsed small bowel
 - B. Air-fluid levels and dilated loops
 - C. Fatty infiltration
 - D. Renal lesion

✓ **Answer: B. Air-fluid levels and dilated loops**
- **1392. CT findings of ovarian torsion include:**
 - A. Small ovary
 - B. Absence of mass
 - C. Enlarged ovary with peripheral follicles
 - D. Uterine calcification

✓ **Answer: C. Enlarged ovary with peripheral follicles**
- **1393. In bladder rupture, CT cystography shows:**
 - A. Normal bladder
 - B. Intraperitoneal or extraperitoneal contrast leak
 - C. Contrast in rectum
 - D. Gallbladder wall defect

✓ **Answer: B. Intraperitoneal or extraperitoneal contrast leak**
- **1394. Ureteric stone is best visualized in:**
 - A. Oral contrast phase
 - B. Unenhanced CT KUB
 - C. Portal phase
 - D. Bone window

✓ **Answer: B. Unenhanced CT KUB**
- **1395. CT in bowel ischemia shows:**
 - A. Hyperenhancing mucosa
 - B. Pneumatosis intestinalis (gas in bowel wall)
 - C. Liver infarct
 - D. Mesenteric hematoma

✓ **Answer: B. Pneumatosis intestinalis (gas in bowel wall)**
- **1396. Hepatocellular carcinoma (HCC) enhances in:**
 - A. Arterial phase
 - B. Venous phase



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- C. Delayed phase only
- D. Non-contrast scan
- ✓ **Answer: A. Arterial phase**
- **1397. Splenic infarct appears as:**
 - A. Central calcification
 - B. Peripheral wedge-shaped hypodensity
 - C. Hyperdense core
 - D. Gas formation✓ **Answer: B. Peripheral wedge-shaped hypodensity**
- **1398. Gallstones in CT appear as:**
 - A. Isoattenuating lesion
 - B. High-density shadow (calcified)
 - C. Only visible on MRI
 - D. Not visualized✓ **Answer: B. High-density shadow (calcified)**
- **1399. A hypodense liver lesion with target sign may indicate:**
 - A. Hepatic cyst
 - B. Metastasis
 - C. Hematoma
 - D. HCC✓ **Answer: B. Metastasis**
- **1400. CT finding of pancreatic cancer:**
 - A. Enlarged, enhancing pancreas
 - B. Hypodense mass in head with biliary dilation
 - C. Fatty infiltration
 - D. Calcified mass✓ **Answer: B. Hypodense mass in head with biliary dilation**
- ---

Emergency Radiography –

Trauma Radiography

- 1401. Which projection is best for evaluating cervical spine trauma in an unconscious patient?**
- A. AP cervical spine



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- B. Lateral cross-table view
- C. Swimmer's view
- D. Open mouth odontoid view

✓ **Answer: B. Lateral cross-table view**

1402. The most important initial radiograph in polytrauma is:

- A. Lateral skull
- B. Chest X-ray
- C. Pelvis X-ray
- D. C-spine X-ray

✓ **Answer: B. Chest X-ray**

1403. The “fat pad sign” in elbow trauma suggests:

- A. Ligament tear
- B. Fracture
- C. Arthritis
- D. Joint effusion

✓ **Answer: B. Fracture**

1404. Best view to assess facial bone fractures:

- A. Caldwell's view
- B. Towne's view
- C. Waters' (occipitomenal) view
- D. Lateral skull

✓ **Answer: C. Waters' (occipitomenal) view**

1405. A widened mediastinum on chest X-ray in trauma suggests:

- A. Pneumonia
- B. Pleural effusion
- C. Aortic injury
- D. Pneumothorax

✓ **Answer: C. Aortic injury**

1406. Which injury is best assessed with a pelvic inlet and outlet view?

- A. Hip dislocation
- B. Sacroiliac joint injury
- C. Pubic rami fracture
- D. Acetabular fracture

✓ **Answer: B. Sacroiliac joint injury**



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1407. The FAST exam includes all of the following EXCEPT:

- A. Morison's pouch
- B. Splenorenal recess
- C. Pericardium
- D. Brain ventricles

✓ **Answer: D. Brain ventricles**

1408. In trauma, pneumoperitoneum is best seen in which view?

- A. Supine abdomen
- B. Prone abdomen
- C. Erect chest or left lateral decubitus
- D. Erect abdomen

✓ **Answer: C. Erect chest or left lateral decubitus**

1409. The "step-off" sign on a lateral spine X-ray indicates:

- A. Disc herniation
- B. Muscle spasm
- C. Vertebral subluxation/fracture
- D. Spondylitis

✓ **Answer: C. Vertebral subluxation/fracture**

1410. Which view helps confirm posterior shoulder dislocation?

- A. AP view only
- B. Y-scapular view
- C. Tangential view
- D. Oblique hand view

✓ **Answer: B. Y-scapular view**

1411. Radiographic hallmark of tension pneumothorax on chest X-ray:

- A. Air bronchogram
- B. Mediastinal shift away from the affected side
- C. Consolidation
- D. Blunting of costophrenic angle

✓ **Answer: B. Mediastinal shift away from the affected side**

1412. The most sensitive modality for detecting spinal cord injury:

- A. X-ray
- B. CT
- C. MRI



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D. Bone scan

✓ **Answer: C. MRI**

1413. What is the first imaging step in evaluating suspected abdominal trauma in a stable patient?

A. CT abdomen

B. FAST

C. Erect X-ray

D. Laparoscopy

✓ **Answer: B. FAST**

1414. In pelvic trauma, the most important X-ray view is:

A. AP pelvis

B. Frog-leg lateral

C. Oblique inlet

D. Lateral lumbar

✓ **Answer: A. AP pelvis**

1415. Nasogastric tube placement should end at the:

A. Stomach antrum

B. Duodenum

C. Lower esophagus

D. GE junction

✓ **Answer: A. Stomach antrum**

1416. "Shifting of mediastinum" suggests:

A. Pleural effusion

B. Pneumonia

C. Tension pneumothorax

D. Pulmonary edema

✓ **Answer: C. Tension pneumothorax**

1417. EFAST adds which area to traditional FAST exam?

A. Lungs for pneumothorax/hemothorax

B. Bladder for rupture

C. Liver for abscess

D. Brain ventricles

✓ **Answer: A. Lungs for pneumothorax/hemothorax**



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1418. Rib fractures on chest X-ray are often missed unless viewed in:

- A. Inspiratory phase
- B. Supine position
- C. Oblique views or CT
- D. Prone views

✓ **Answer: C. Oblique views or CT**

1419. Most sensitive modality for rib fractures:

- A. Ultrasound
- B. X-ray
- C. MRI
- D. CT

✓ **Answer: D. CT**

1420. Which sign on chest X-ray suggests diaphragmatic rupture?

- A. Blunting of costophrenic angle
- B. Elevated hemidiaphragm with bowel loops in chest
- C. Consolidation
- D. Pleural thickening

✓ **Answer: B. Elevated hemidiaphragm with bowel loops in chest**

Emergency Chest Imaging

1421. Pneumothorax appears on X-ray as:

- A. Homogeneous opacity
- B. Blunted costophrenic angle
- C. Absent lung markings peripherally
- D. Air bronchogram

✓ **Answer: C. Absent lung markings peripherally**

1422. Most sensitive position to detect small pneumothorax:

- A. Prone
- B. Supine
- C. Expiratory view or lateral decubitus
- D. AP chest

✓ **Answer: C. Expiratory view or lateral decubitus**



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1423. The “deep sulcus sign” is seen in:

- A. Supine pneumothorax
- B. Pneumoperitoneum
- C. Pleural effusion
- D. Tuberculosis

✓ **Answer: A. Supine pneumothorax**

1424. In pulmonary embolism, Westermark’s sign is:

- A. Focal oligemia (area of decreased vascularity)
- B. Consolidation
- C. Collapse
- D. Cardiomegaly

✓ **Answer: A. Focal oligemia (area of decreased vascularity)**

1425. Kerley B lines are seen in:

- A. Pulmonary embolism
- B. Congestive heart failure
- C. Pneumothorax
- D. ARDS

✓ **Answer: B. Congestive heart failure**

1426. The bat wing appearance in chest X-ray indicates:

- A. Pneumonia
- B. ARDS
- C. Pulmonary edema
- D. Emphysema

✓ **Answer: C. Pulmonary edema**

1427. ARDS on X-ray appears as:

- A. Localized consolidation
- B. Bilateral diffuse alveolar infiltrates
- C. Pleural thickening
- D. Bronchial calcification

✓ **Answer: B. Bilateral diffuse alveolar infiltrates**

1428. “Hampton’s hump” is seen in:

- A. Tuberculosis
- B. Pulmonary embolism
- C. Pneumonia



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D. Lung abscess

✓ **Answer: B. Pulmonary embolism**

1429. Endotracheal tube placement on X-ray should be:

A. At the carina

B. 2–5 cm above carina

C. In right main bronchus

D. In left bronchus

✓ **Answer: B. 2–5 cm above carina**

1430. A misplaced central line can lead to:

A. Pleural effusion

B. Pneumothorax

C. Both A and B

D. None

✓ **Answer: C. Both A and B**

1431. Consolidation in a child with high fever suggests:

A. Bronchial asthma

B. Pneumonia

C. Heart failure

D. Tumor

✓ **Answer: B. Pneumonia**

1432. Pleural effusion on upright X-ray is seen as:

A. Hyperlucency

B. Air bronchogram

C. Meniscus-shaped opacity at base

D. Reticulonodular opacity

✓ **Answer: C. Meniscus-shaped opacity at base**

1433. Chest X-ray finding in COVID-19:

A. Upper lobe nodules

B. Bilateral peripheral opacities

C. Hilar lymphadenopathy

D. Cavity formation

✓ **Answer: B. Bilateral peripheral opacities**



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1434. Which emergency chest sign is best seen in lateral decubitus view?

- A. Pneumothorax
- B. Consolidation
- C. Pleural effusion
- D. Cardiomegaly

✓ **Answer: C. Pleural effusion**

1435. Hydropneumothorax appears as:

- A. Single fluid level
- B. Air-fluid level with sharp horizontal interface
- C. Patchy opacity
- D. Normal lung

✓ **Answer: B. Air-fluid level with sharp horizontal interface**

Pediatric Emergency Imaging

1436. The most common site of non-accidental injury (child abuse) is:

- A. Skull
- B. Femur
- C. Posterior ribs
- D. Humerus

✓ **Answer: C. Posterior ribs**

1437. Classic metaphyseal lesions in pediatric trauma are suggestive of:

- A. Osteogenesis imperfecta
- B. Rickets
- C. Non-accidental trauma
- D. Congenital dysplasia

✓ **Answer: C. Non-accidental trauma**

1438. Croup appears on neck X-ray as:

- A. Steeple sign
- B. Thumb sign
- C. Cervical lordosis
- D. String sign

✓ **Answer: A. Steeple sign**



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1439. Epiglottitis appears on lateral neck X-ray as:

- A. Steeple sign
- B. Thumb sign
- C. Onion skinning
- D. Trident sign

✓ **Answer: B. Thumb sign**

1440. Pyloric stenosis is evaluated best using:

- A. CT abdomen
- B. X-ray KUB
- C. Ultrasound
- D. MRI

✓ **Answer: C. Ultrasound**

1441. The “double bubble” sign on abdominal X-ray in neonates indicates:

- A. Volvulus
- B. Hirschsprung disease
- C. Duodenal atresia
- D. NEC

✓ **Answer: C. Duodenal atresia**

1442. Pneumatosis intestinalis on neonatal X-ray suggests:

- A. Gastroenteritis
- B. NEC (Necrotizing Enterocolitis)
- C. Volvulus
- D. Intussusception

✓ **Answer: B. NEC**

1443. The most common foreign body in pediatric airways is:

- A. Metal coin
- B. Peanut
- C. Battery
- D. Paper clip

✓ **Answer: B. Peanut**

1444. In suspected foreign body aspiration, what is best next step?

- A. Lateral chest X-ray
- B. CT scan
- C. Expiratory and inspiratory chest films



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D. IV contrast

✓ **Answer: C. Expiratory and inspiratory chest films**

1445. Intussusception may show which classic sign on imaging?

A. Thumbprinting

B. Target sign

C. Apple core lesion

D. Meniscus sign

✓ **Answer: B. Target sign**

1446. X-ray finding of Hirschsprung disease:

A. Normal colon gas pattern

B. Dilated proximal colon with transition zone

C. Free air under diaphragm

D. Pneumatosis

✓ **Answer: B. Dilated proximal colon with transition zone**

1447. Radiographic evaluation of febrile seizure includes:

A. Skull X-ray

B. CT head (if first-time or prolonged)

C. Sinus X-ray

D. None required

✓ **Answer: B. CT head (if first-time or prolonged)**

1448. Foreign bodies in the esophagus are usually lodged at:

A. Aortic arch level

B. Lower esophageal sphincter

C. Cricopharyngeal level

D. Stomach

✓ **Answer: C. Cricopharyngeal level**

1449. The earliest X-ray sign of rickets in a child is:

A. Bowing of legs

B. Metaphyseal cupping and fraying

C. Bone demineralization

D. Multiple fractures

✓ **Answer: B. Metaphyseal cupping and fraying**



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1450. Spina bifida on X-ray appears as:

- A. Spinal angulation
- B. Non-fusion of posterior vertebral arches
- C. Rib notching
- D. Butterfly vertebra

✓ **Answer: B. Non-fusion of posterior vertebral arches**

Spinal Injuries & Extremities

1451. The best initial view for spinal trauma is:

- A. Oblique
- B. Lateral
- C. Anteroposterior
- D. Swimmer's view

✓ **Answer: B. Lateral**

1452. Chance fracture is associated with:

- A. Hyperextension
- B. Flexion–distraction injury
- C. Rotational trauma
- D. Axial loading

✓ **Answer: B. Flexion–distraction injury**

1453. Teardrop fracture is most commonly seen in:

- A. C1
- B. C2
- C. C3
- D. C5–C7

✓ **Answer: D. C5–C7**

1454. A burst fracture commonly occurs at:

- A. Cervical spine
- B. Thoracic spine
- C. Lumbar spine (L1)
- D. Sacrum

✓ **Answer: C. Lumbar spine (L1)**



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1455. “Winking owl” sign in spine X-ray suggests:

- A. Osteoporosis
- B. Metastasis
- C. Spondylolisthesis
- D. Disc herniation

✓ **Answer: B. Metastasis**

1456. Jefferson fracture involves:

- A. C1 atlas ring
- B. C2 dens
- C. C3 vertebral body
- D. C7 spinous process

✓ **Answer: A. C1 atlas ring**

1457. Hangman’s fracture involves which structure?

- A. Pedicles of C2
- B. Body of C1
- C. Spinous process of C5
- D. Odontoid process

✓ **Answer: A. Pedicles of C2**

1458. The most common cause of anterior cord syndrome is:

- A. Hyperextension
- B. Flexion injury
- C. Central disc herniation
- D. Penetrating trauma

✓ **Answer: B. Flexion injury**

1459. The “empty vertebral body” sign on lateral spine X-ray indicates:

- A. Spina bifida
- B. Spondylitis
- C. Flexion-distraction injury
- D. Fracture dislocation

✓ **Answer: D. Fracture dislocation**

1460. Clay-shoveler’s fracture occurs at:

- A. C1
- B. C3
- C. C6–C7 spinous process



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D. T1

✓ **Answer: C. C6–C7 spinous process**

CT Abdomen & Pelvis Emergencies

1461. The most sensitive imaging for acute appendicitis in adults is:

- A. X-ray abdomen
- B. CT abdomen with contrast
- C. MRI
- D. Ultrasound

✓ **Answer: B. CT abdomen with contrast**

1462. Classic CT sign of appendicitis includes:

- A. Dilated fluid-filled appendix >6 mm
- B. Pneumoperitoneum
- C. Mesenteric twist
- D. Target sign

✓ **Answer: A. Dilated fluid-filled appendix >6 mm**

1463. “Target sign” or “bull’s-eye” appearance in bowel loops on CT suggests:

- A. Appendicitis
- B. Intussusception
- C. Volvulus
- D. IBD

✓ **Answer: B. Intussusception**

1464. Closed loop obstruction on CT is characterized by:

- A. Multiple loops with normal wall
- B. Two transition points with C- or U-shaped loop
- C. Collapsed bowel



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D. Wall thickening only

✓ **Answer: B. Two transition points with C- or U-shaped loop**

1465. The “whirl sign” on CT is associated with:

A. Appendicitis

B. Crohn’s disease

C. Volvulus (mesenteric twisting)

D. Free fluid

✓ **Answer: C. Volvulus (mesenteric twisting)**

1466. Pneumoperitoneum is best seen on CT in which position:

A. Prone

B. Supine

C. Left lateral decubitus

D. Erect

✓ **Answer: D. Erect**

1467. The “small bowel feces sign” on CT suggests:

A. Large bowel obstruction

B. Inflammatory bowel disease

C. Small bowel obstruction

D. Ischemia

✓ **Answer: C. Small bowel obstruction**

1468. The “sentinel loop” and “colon cut-off” signs are seen in:

A. Ileus

B. Pancreatitis

C. Appendicitis

D. Ascites

✓ **Answer: B. Pancreatitis**



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1469. CT finding of mesenteric ischemia includes:

- A. Bowel wall enhancement
- B. Pneumatosis intestinalis
- C. Normal bowel wall
- D. Increased peristalsis

✓ **Answer: B. Pneumatosis intestinalis**

1470. Solid organ most frequently injured in blunt abdominal trauma:

- A. Kidney
- B. Spleen
- C. Liver
- D. Pancreas

✓ **Answer: B. Spleen**

1471. Contrast extravasation on trauma CT suggests:

- A. Healed laceration
- B. Active bleeding
- C. Abscess
- D. Cyst

✓ **Answer: B. Active bleeding**

1472. CT finding in liver laceration includes:

- A. Hyperdense capsule
- B. Hypodense linear defects in parenchyma
- C. Gas in bile ducts
- D. Calcification

✓ **Answer: B. Hypodense linear defects in parenchyma**



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1473. The most common CT finding in abdominal trauma is:

- A. Hemoperitoneum
- B. Calcified liver
- C. Cystic kidney
- D. Pneumoperitoneum

✓ **Answer: A. Hemoperitoneum**

1474. “Streak artifact” in the upper abdomen CT is usually due to:

- A. Pancreatitis
- B. Liver injury
- C. Contrast in bowel
- D. Beam hardening from contrast in IVC or aorta

✓ **Answer: D. Beam hardening from contrast in IVC or aorta**

1475. Delayed phase CT in trauma is used to detect:

- A. Lymphadenopathy
- B. Arterial stenosis
- C. Urinary extravasation or bile leak
- D. Hernia

✓ **Answer: C. Urinary extravasation or bile leak**

1476. Best CT phase to detect liver lacerations:

- A. Non-contrast
- B. Arterial phase
- C. Portal venous phase
- D. Delayed phase

✓ **Answer: C. Portal venous phase**

1477. Which of the following is a sign of bowel ischemia on CT?

- A. Mural hyperenhancement



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- B. Pneumatosis
- C. Mucosal thickening
- D. Ascites alone

✓ **Answer: B. Pneumatosis**

1478. CT sign of bladder rupture includes:

- A. Wall thickening
- B. Free pelvic gas
- C. Contrast extravasation into peritoneum
- D. Hydronephrosis

✓ **Answer: C. Contrast extravasation into peritoneum**

1479. “Comb sign” in bowel mesentery is seen in:

- A. Volvulus
- B. Appendicitis
- C. Crohn’s disease
- D. Pancreatitis

✓ **Answer: C. Crohn’s disease**

1480. CT grading of renal trauma uses:

- A. AAST grading
- B. Bosniak criteria
- C. Karnofsky score
- D. TNM staging

✓ **Answer: A. AAST grading**

1481. Perisplenic hyperdensity in trauma CT indicates:

- A. Fat
- B. Bowel gas
- C. Hematoma



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D. Calcification

✓ **Answer: C. Hematoma**

1482. A striated nephrogram pattern on CT suggests:

A. Normal scan

B. Infarction

C. Acute pyelonephritis

D. Trauma

✓ **Answer: C. Acute pyelonephritis**

1483. CT findings in testicular torsion may include:

A. Hypoenhancement of the testis

B. Large hydrocele

C. Hypervascular testis

D. Normal scan

✓ **Answer: A. Hypoenhancement of the testis**

1484. A “fat stranding” pattern around bowel loop suggests:

A. Hemoperitoneum

B. Active bleed

C. Inflammation

D. Ischemia

✓ **Answer: C. Inflammation**

1485. Appendicolith appears on CT as:

A. Soft-tissue density

B. Fatty lesion

C. Calcified focus near base of appendix

D. Air pocket

✓ **Answer: C. Calcified focus near base of appendix**



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1486. Which phase is best for pancreas in trauma CT?

- A. Arterial phase
- B. Portal venous phase
- C. Pancreatic phase
- D. Delayed phase

✓ **Answer: C. Pancreatic phase**

1487. Intra-abdominal abscess on CT appears as:

- A. Solid mass
- B. Hyperdense structure
- C. Thick-walled fluid collection \pm air
- D. Calcified lesion

✓ **Answer: C. Thick-walled fluid collection \pm air**

1488. The “string of pearls” sign in CT suggests:

- A. Crohn’s
- B. Ileus
- C. Small bowel obstruction with air-fluid levels
- D. Constipation

✓ **Answer: C. Small bowel obstruction with air-fluid levels**

1489. Mesenteric vascular injury on CT is indicated by:

- A. Fat stranding only
- B. Discontinuity of vessels or extravasation
- C. Mucosal thickening
- D. Fluid collection

✓ **Answer: B. Discontinuity of vessels or extravasation**



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1490. Which modality is most accurate for detecting diaphragmatic rupture?

- A. Chest X-ray
- B. Ultrasound
- C. CT thoracoabdomen
- D. MRI

✓ **Answer: C. CT thoracoabdomen**

1491. Bowel wall “target sign” with mucosal and serosal enhancement is suggestive of:

- A. Active inflammation or ischemia
- B. Tumor
- C. Abscess
- D. Foreign body

✓ **Answer: A. Active inflammation or ischemia**

1492. Free air under diaphragm on erect chest X-ray is a sign of:

- A. Ascites
- B. Small bowel obstruction
- C. Perforation
- D. Pneumonia

✓ **Answer: C. Perforation**

1493. Which is a delayed complication of solid organ trauma seen on CT?

- A. Hematoma
- B. Arteriovenous fistula
- C. Pneumothorax
- D. Ascites

✓ **Answer: B. Arteriovenous fistula**

1494. “Double duct sign” on CT abdomen suggests:

- A. Appendicitis



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- B. Pancreatic head tumor
 - C. Bowel perforation
 - D. Renal colic
 - ✓ **Answer: B. Pancreatic head tumor**
-

1495. Common CT sign of sigmoid volvulus is:

- A. Coffee-bean sign
 - B. Apple-core lesion
 - C. Comb sign
 - D. Swirl sign
 - ✓ **Answer: A. Coffee-bean sign**
-

1496. Most sensitive sign of bowel ischemia on CT:

- A. Free air
 - B. Pneumatosis
 - C. Ascites
 - D. Thickened bowel wall
 - ✓ **Answer: B. Pneumatosis**
-

1497. Most appropriate contrast phase for small bowel pathology evaluation:

- A. Non-contrast
 - B. Arterial phase
 - C. Portal venous phase with enteric contrast
 - D. Delayed phase
 - ✓ **Answer: C. Portal venous phase with enteric contrast**
-

1498. The “accordion sign” in CT is seen in:

- A. Crohn’s disease
- B. Ulcerative colitis
- C. Pseudomembranous colitis



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D. Volvulus

✓ **Answer: C. Pseudomembranous colitis**

1499. Most likely CT finding in a patient with acute diverticulitis:

A. Air-fluid level in stomach

B. Fat stranding adjacent to thickened colon

C. Lymphadenopathy

D. Calcified nodule

✓ **Answer: B. Fat stranding adjacent to thickened colon**

1500. Free intraperitoneal fluid in trauma patient on CT is most commonly located in:

A. Pleural space

B. Morrison's pouch

C. Retroperitoneum

D. Subgaleal space

✓ **Answer: B. Morrison's pouch**

Emergency Head CT

1501. The most sensitive modality for acute head trauma is:

A. MRI

B. CT without contrast

C. X-ray

D. PET

✓ **Answer: B. CT without contrast**

1502. Epidural hematoma on CT appears as:

A. Crescent-shaped hyperdensity

B. Lentiform (biconvex) hyperdense collection

C. Hypodense area



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D. Mixed density

✓ **Answer: B. Lentiform (biconvex) hyperdense collection**

1503. Subdural hematoma classically shows what shape on CT?

A. Lentiform

B. Crescentic

C. Star-shaped

D. Circular

✓ **Answer: B. Crescentic**

1504. Hyperdensity in basal cisterns in trauma suggests:

A. Subarachnoid hemorrhage (SAH)

B. Epidural bleed

C. Edema

D. Air embolism

✓ **Answer: A. Subarachnoid hemorrhage (SAH)**

1505. In DAI (Diffuse Axonal Injury), which finding may be present on CT?

A. Large hematoma

B. Microhemorrhages at gray-white matter junction

C. Calcified sulci

D. Normal brain

✓ **Answer: B. Microhemorrhages at gray-white matter junction**

1506. Midline shift on CT is a sign of:

A. Normal anatomy

B. Raised intracranial pressure or mass effect

C. Herniation only

D. Ischemia

✓ **Answer: B. Raised intracranial pressure or mass effect**

1507. "Swirl sign" in an EDH indicates:

A. Active bleeding within the clot

B. Chronic bleed

C. Tumor

D. Normal finding

✓ **Answer: A. Active bleeding within the clot**



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1508. CT scan in acute stroke should be done:

- A. With contrast
- B. Without contrast
- C. Only MRI
- D. After 6 hours

✓ **Answer: B. Without contrast**

1509. A hyperdense MCA sign indicates:

- A. Normal finding
- B. Air embolism
- C. Acute thrombus in MCA
- D. Chronic infarct

✓ **Answer: C. Acute thrombus in MCA**

1510. Acute infarct in CT appears as:

- A. Hyperdensity in sulci
- B. Hypodense region with sulcal effacement
- C. Bony defect
- D. Calcified gyri

✓ **Answer: B. Hypodense region with sulcal effacement**

1511. “Obliteration of the insular ribbon” on CT is early sign of:

- A. Ischemic stroke
- B. Edema
- C. Hematoma
- D. Brain abscess

✓ **Answer: A. Ischemic stroke**

1512. Best window for brain parenchyma on CT:

- A. Lung window
- B. Bone window
- C. Brain window (40/100)
- D. Mediastinal window

✓ **Answer: C. Brain window (40/100)**

1513. Herniation of brain tissue on CT can be identified by:

- A. Shift of midline structures
- B. Skull fracture
- C. Hydrocephalus



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D. SAH

✓**Answer: A. Shift of midline structures**

1514. Skull fracture best seen on CT in which window?

A. Soft tissue window

B. Brain window

C. Bone window

D. None of the above

✓**Answer: C. Bone window**

1515. Subarachnoid hemorrhage most commonly occurs in:

A. Sylvian fissure, basal cisterns

B. Parietal lobe

C. Falx cerebri

D. Ventricles

✓**Answer: A. Sylvian fissure, basal cisterns**

1516. Intra-ventricular hemorrhage appears as:

A. Dark ventricles

B. Hyperdense layering in ventricles

C. Midline shift

D. Hypodense third ventricle

✓**Answer: B. Hyperdense layering in ventricles**

1517. In trauma, CT base of skull is used to identify:

A. Orbit injury

B. Petrous bone fractures

C. Maxillary fracture

D. Pituitary tumor

✓**Answer: B. Petrous bone fractures**

1518. Cerebral edema appears as:

A. Increased sulcal spaces

B. Hypodense white matter with sulcal effacement

C. Hyperdense basal ganglia

D. Enhancing gyri

✓**Answer: B. Hypodense white matter with sulcal effacement**



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1519. “Dense cerebellar hemispheres” may be seen in:

- A. Normal scan
- B. Infarct
- C. Posterior fossa hemorrhage
- D. Atrophy

✓ **Answer: C. Posterior fossa hemorrhage**

1520. Which sign is characteristic of basilar skull fracture on CT?

- A. Pneumocephalus
- B. Lentiform hematoma
- C. Enlarged ventricles
- D. Sclerotic petrous bone

✓ **Answer: A. Pneumocephalus**

CT Chest in Emergency

1521. The most sensitive imaging for pulmonary embolism (PE) is:

- A. V/Q scan
- B. Chest X-ray
- C. CT Pulmonary Angiography (CTPA)
- D. Ultrasound

✓ **Answer: C. CT Pulmonary Angiography (CTPA)**

1522. Westermark’s sign on CT suggests:

- A. Lung mass
- B. Pneumonia
- C. Pulmonary embolism
- D. Pneumothorax

✓ **Answer: C. Pulmonary embolism**



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1523. Hampton's hump indicates:

- A. Cavitation
- B. Pulmonary infarct (wedge-shaped opacity)
- C. Pulmonary nodule
- D. Tracheal deviation

✓ **Answer: B. Pulmonary infarct (wedge-shaped opacity)**

1524. Contrast bolus timing for CTPA is aimed at enhancing the:

- A. Aorta
- B. Right atrium
- C. Pulmonary arteries
- D. Pulmonary veins

✓ **Answer: C. Pulmonary arteries**

1525. Aortic injury in trauma is best evaluated by:

- A. MRI
- B. CT angiography (CTA) chest
- C. Chest X-ray
- D. Echocardiography

✓ **Answer: B. CT angiography (CTA) chest**

1526. Which CT sign suggests active bleeding in chest trauma?

- A. Air-fluid level
- B. Contrast extravasation
- C. Hyperdense clot
- D. Lung collapse

✓ **Answer: B. Contrast extravasation**

1527. Pulmonary contusion on CT appears as:

- A. Consolidation with air bronchograms
- B. Patchy ground-glass or alveolar opacities
- C. Well-defined nodule
- D. Pleural effusion

✓ **Answer: B. Patchy ground-glass or alveolar opacities**

1528. The "fallen lung sign" suggests:

- A. Pneumonia
- B. Tracheal injury
- C. Bronchial tear



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D. Pneumopericardium

✓ **Answer: C. Bronchial tear**

1529. Traumatic aortic rupture most commonly occurs at:

A. Ascending aorta

B. Aortic root

C. Isthmus (distal to left subclavian artery)

D. Diaphragmatic hiatus

✓ **Answer: C. Isthmus (distal to left subclavian artery)**

1530. Which is not a typical finding in aortic injury on CT?

A. Intimal flap

B. Pseudoaneurysm

C. Aortic transection

D. Air bronchogram

✓ **Answer: D. Air bronchogram**

1531. Pneumomediastinum on CT indicates:

A. Pulmonary edema

B. Tracheobronchial injury

C. Ascites

D. Pleural effusion

✓ **Answer: B. Tracheobronchial injury**

1532. Subcutaneous emphysema appears on CT as:

A. Hyperdense band

B. Hypodense soft tissue mass

C. Air in subcutaneous planes

D. Fluid collection

✓ **Answer: C. Air in subcutaneous planes**

1533. Rib fractures with sternal fractures may indicate:

A. Simple chest trauma

B. Flail chest

C. Pneumopericardium

D. Pulmonary embolism

✓ **Answer: B. Flail chest**



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1534. Pneumopericardium on CT is visualized as:

- A. Pleural thickening
- B. Air outlining the heart within pericardial sac
- C. Hyperdensity in ventricles
- D. Calcification in pericardium

✓ **Answer: B. Air outlining the heart within pericardial sac**

1535. Chest CT in blunt trauma should ideally be done with:

- A. Oral contrast only
- B. Delayed phase imaging
- C. Non-contrast and contrast-enhanced phases
- D. T2-weighted MRI

✓ **Answer: C. Non-contrast and contrast-enhanced phases**

Stroke Protocols & Vascular CT

1536. CT angiography for stroke is used to visualize:

- A. Brain perfusion only
- B. Paranasal sinuses
- C. Intracranial and extracranial vessels
- D. CSF spaces

✓ **Answer: C. Intracranial and extracranial vessels**

1537. CT Perfusion helps to detect:

- A. Tumor location
- B. Hemorrhagic stroke
- C. Ischemic penumbra
- D. Brain metastasis

✓ **Answer: C. Ischemic penumbra**

1538. The infarct core in CT perfusion has:

- A. High CBV, low CBF
- B. Low CBV, low CBF
- C. High MTT only
- D. Normal values

✓ **Answer: B. Low CBV, low CBF**



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1539. Most accurate time to perform CTA in suspected stroke:

- A. After 24 hours
- B. During IV thrombolysis
- C. Within first 6 hours
- D. After CT perfusion

✓ **Answer: C. Within first 6 hours**

1540. For CTA neck, contrast bolus is timed to capture:

- A. Pulmonary arteries
- B. Common carotids and internal carotids
- C. Circle of Willis only
- D. SVC

✓ **Answer: B. Common carotids and internal carotids**

1541. Which parameter is not part of standard CT perfusion maps?

- A. CBF
- B. CBV
- C. MTT
- D. SUV

✓ **Answer: D. SUV**

1542. CTA of the aorta includes imaging from:

- A. Skull base to vertex
- B. Diaphragm to pelvis
- C. Thoracic inlet to iliac bifurcation
- D. Aortic arch to stomach

✓ **Answer: C. Thoracic inlet to iliac bifurcation**

1543. Which of the following is a CTA finding in arterial dissection?

- A. Enhancing mass
- B. Intimal flap with double lumen
- C. Pleural thickening
- D. Collapsed vessel

✓ **Answer: B. Intimal flap with double lumen**

1544. Best modality to rule out cerebral aneurysm in emergency:

- A. CT perfusion
- B. Plain CT
- C. CT angiography



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D. Sinus X-ray

✓**Answer: C. CT angiography**

1545. “Spot sign” in intracerebral hematoma on CTA indicates:

A. Stable bleed

B. Tumor

C. Active contrast leak = ongoing hemorrhage

D. Venous infarct

✓**Answer: C. Active contrast leak = ongoing hemorrhage**

1546. CT venography is indicated in suspected:

A. Cavernoma

B. Aneurysm

C. CVT (Cerebral venous thrombosis)

D. Glioma

✓**Answer: C. CVT (Cerebral venous thrombosis)**

1547. CTA of pulmonary artery uses:

A. Oral barium

B. Arterial phase contrast, 100–120 ml

C. Delayed scan

D. Non-contrast scan

✓**Answer: B. Arterial phase contrast, 100–120 ml**

1548. Which artery is evaluated in suspected aortic dissection?

A. Pulmonary artery

B. Renal artery

C. Aortic arch and descending aorta

D. Coronary arteries

✓**Answer: C. Aortic arch and descending aorta**

1549. What is the common artifact in CTA head due to metallic clips?

A. Ring artifact

B. Beam hardening

C. Ghosting

D. Motion blur

✓**Answer: B. Beam hardening**



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1550. Volume rendering in CT angiography helps in:

- A. Showing tumors
- B. Bone age
- C. 3D vascular anatomy reconstruction
- D. Perfusion analysis

✓ **Answer: C. 3D vascular anatomy reconstruction**

Miscellaneous CT Topics –

1550. What artifact appears as alternating light and dark bands in helical CT scans?

- A. Beam hardening
- B. Windmill artifact
- C. Motion artifact
- D. Ring artifact

✓ **Answer: B. Windmill artifact**

1551. What is the purpose of bowtie filters in CT?

- A. Increase noise
- B. Shape the X-ray beam and reduce peripheral dose
- C. Improve contrast
- D. Prevent tube overheating

✓ **Answer: B. Shape the X-ray beam and reduce peripheral dose**

1552. Which CT dose parameter reflects radiation per slice?

- A. CTDIvol
- B. DLP
- C. mA
- D. Pitch

✓ **Answer: A. CTDIvol**



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1553. What does a high pitch (>1.5) typically result in?

- A. High dose and image quality
- B. Lower dose, faster scan, but possible degradation
- C. Increased contrast
- D. No effect

✓ **Answer: B. Lower dose, faster scan, but possible degradation**

1554. Which artifact is produced by improper detector calibration?

- A. Beam hardening
- B. Ring artifact
- C. Windmill artifact
- D. Motion artifact

✓ **Answer: B. Ring artifact**

1555. Gantry tilt is most often used in which CT exam?

- A. Chest CT
- B. CT brain
- C. CT sinuses
- D. Cardiac CT

✓ **Answer: B. CT brain**

1556. Image matrix in CT defines:

- A. FOV
- B. Number of gray levels
- C. Pixel size and resolution
- D. kVp setting

✓ **Answer: C. Pixel size and resolution**

1557. PACS stands for:

- A. Picture and Archive Communication System



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- B. Portable and Central Storage
- C. Patient Analysis Computation System
- D. Post-Acquisition Conversion Software

✓ **Answer: A. Picture and Archive Communication System**

1558. RIS manages:

- A. X-ray tube heating
- B. Scheduling, reporting, and billing
- C. Detector response
- D. Image reconstruction

✓ **Answer: B. Scheduling, reporting, and billing**

1559. Window level in CT affects:

- A. Contrast only
- B. Brightness
- C. Slice thickness
- D. Pitch

✓ **Answer: B. Brightness**

1560. Hounsfield Unit of blood (acute hemorrhage) on CT is typically:

- A. -20 to 0
- B. 0 to +20
- C. +40 to +60
- D. +100 to +200

✓ **Answer: C. +40 to +60**

1561. In QA testing, spatial resolution is tested using:

- A. Water phantom
- B. Line pair phantom
- C. Air gap technique



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D. Lead grid

✓**Answer: B. Line pair phantom**

1562. What does DICOM standard ensure?

A. Thermal insulation

B. Image compression only

C. Interoperability between imaging systems

D. Contrast safety

✓**Answer: C. Interoperability between imaging systems**

1563. CT scanner's automatic exposure control adjusts:

A. kVp based on patient size

B. mA based on tissue attenuation

C. Gantry rotation time

D. Table increment

✓**Answer: B. mA based on tissue attenuation**

1564. Which of the following defines CT spatial resolution?

A. HU value

B. Noise index

C. Smallest visible object

D. Detector pitch

✓**Answer: C. Smallest visible object**

1565. An ROI measurement in the liver gives -100 HU. This suggests:

A. Tumor

B. Calcification

C. Fatty infiltration

D. Artifact

✓**Answer: C. Fatty infiltration**



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1566. CT metal artifact reduction techniques include all EXCEPT:

- A. Dual-energy subtraction
- B. Iterative reconstruction
- C. Use of thin slices
- D. Lowering kVp

✓ **Answer: D. Lowering kVp**

1567. Advantage of iterative reconstruction over filtered back projection is:

- A. Lower noise and dose
- B. Higher HU accuracy
- C. Faster scan
- D. Color imaging

✓ **Answer: A. Lower noise and dose**

1568. Pixel size in CT depends on:

- A. Matrix and FOV
- B. kVp and mAs
- C. Gantry speed
- D. Filter shape

✓ **Answer: A. Matrix and FOV**

1569. The term “z-axis coverage” refers to:

- A. Gantry thickness
- B. Tube heating limit
- C. Patient length scanned
- D. Image matrix

✓ **Answer: C. Patient length scanned**



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1570. Cardiac CT uses ECG-gated scanning primarily to reduce:

- A. Motion blur
- B. Radiation dose
- C. Tube current
- D. Contrast usage

✓ **Answer: A. Motion blur**

1571. The ALARA principle stands for:

- A. All Limited Analysis Radiology Accuracy
- B. As Low As Reasonably Achievable
- C. Active Load Adjustment for Radiation
- D. Annual Limitation and Risk Awareness

✓ **Answer: B. As Low As Reasonably Achievable**

1572. Which clinical indication is best suited for low-dose CT?

- A. Acute stroke
- B. Lung cancer screening
- C. Abdominal trauma
- D. Brain tumor

✓ **Answer: B. Lung cancer screening**

1573. Which of the following is a dose-saving technique in pediatric CT?

- A. Increasing kVp
- B. Increasing mAs
- C. Tube current modulation
- D. Using contrast always

✓ **Answer: C. Tube current modulation**

1574. Effective dose in CT is highest in which exam?

- A. Brain



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- B. Chest
- C. Abdomen-pelvis
- D. Sinuses

✓ **Answer: C. Abdomen-pelvis**

1575. Limiting CT scan range helps reduce:

- A. Noise
- B. Contrast need
- C. Radiation dose
- D. Scan time only

✓ **Answer: C. Radiation dose**

1576. Streak artifacts commonly arise from:

- A. Air-fluid levels
- B. Metal implants
- C. Patient motion
- D. Filter failure

✓ **Answer: B. Metal implants**

1577. The dose unit "mSv" in CT reflects:

- A. Radiation absorbed by machine
- B. Biological effect (effective dose)
- C. Number of scans
- D. Tube heat capacity

✓ **Answer: B. Biological effect (effective dose)**

1578. Noise in CT increases when:

- A. mAs is increased
- B. Slice thickness increases
- C. Matrix is decreased



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D. mAs is reduced

✓ **Answer: D. mAs is reduced**

1579. CT image slice thickness impacts:

A. Pixel size

B. Temporal resolution

C. Z-axis resolution

D. Tube current

✓ **Answer: C. Z-axis resolution**

1580. Which is NOT a feature of PACS?

A. Image storage

B. Scheduling of patients

C. Image retrieval

D. Remote access

✓ **Answer: B. Scheduling of patients**

1581. Advantage of thin-slice reconstruction in CT:

A. Faster scan time

B. Better spatial resolution

C. Lower dose

D. Reduced motion artifact

✓ **Answer: B. Better spatial resolution**

1582. What is used for CT number calibration in QA?

A. Air phantom

B. Water phantom

C. Lead filter

D. Glass bead

✓ **Answer: B. Water phantom**



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1583. An overexposed CT image will appear:

- A. Too white
- B. Too dark
- C. Unaffected
- D. With beam hardening

✓ **Answer: B. Too dark**

1584. "Window width" in CT refers to:

- A. Slice interval
- B. Range of HU values displayed
- C. Patient's size
- D. Noise level

✓ **Answer: B. Range of HU values displayed**

1585. Which tissue has HU near zero?

- A. Air
- B. Water
- C. Bone
- D. Muscle

✓ **Answer: B. Water**

1586. Which software layer connects RIS and PACS?

- A. DICOM
- B. HL7
- C. XML
- D. FTP

✓ **Answer: B. HL7**



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1587. Which of the following is NOT a radiological artifact?

- A. Ring artifact
- B. Streak artifact
- C. Blooming artifact
- D. Gibbs ringing

✓ **Answer: C. Blooming artifact**

1588. Primary use of CT scout image:

- A. Diagnosis
- B. Measurement
- C. Planning scan range
- D. Dose calculation

✓ **Answer: C. Planning scan range**

1589. A lesion measures 12 HU on CT. It likely represents:

- A. Fluid
- B. Soft tissue mass
- C. Cyst
- D. Fat

✓ **Answer: A. Fluid**

1590. CT slice misregistration occurs due to:

- A. Pitch change
- B. Breath-hold failure
- C. Gantry misalignment
- D. Collimation

✓ **Answer: B. Breath-hold failure**

1591. Hounsfield unit of compact bone is typically:

- A. -1000 to -200



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- B. 0 to +40
- C. +300 to +1000
- D. +100 to +300

✓ Answer: C. +300 to +1000

1592. Beam hardening artifact is minimized by using:

- A. Narrow beam
- B. Filters and calibration
- C. Lower kVp
- D. Shorter gantry time

✓ Answer: B. Filters and calibration

1593. What does CTDI measure?

- A. Organ-specific dose
- B. Patient's exposure to scatter
- C. Dose in a standard phantom
- D. Radiation absorbed by skin

✓ Answer: C. Dose in a standard phantom

1594. CT number for lung parenchyma is approximately:

- A. -1000
- B. -800
- C. -500
- D. -200

✓ Answer: C. -500

1595. Which of the following is not a reconstruction algorithm?

- A. Bone
- B. Soft tissue
- C. High resolution



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D. Noise index

✓ **Answer: D. Noise index**

1596. Radiation dose is higher in:

A. Low pitch scanning

B. High pitch scanning

C. Dual-energy

D. Scout scan

✓ **Answer: A. Low pitch scanning**

1597. In QA, image uniformity is tested using:

A. Bar phantom

B. Edge phantom

C. Uniform water phantom

D. Bone window

✓ **Answer: C. Uniform water phantom**

1598. CT scanner warm-up test is recommended:

A. Daily

B. Weekly

C. Monthly

D. Yearly

✓ **Answer: A. Daily**

1599. Automatic exposure control modulates:

A. Gantry speed

B. kVp

C. mA

D. FOV

✓ **Answer: C. mA**



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1600. DICOM header contains:

- A. Pixel value
 - B. Image display settings
 - C. Patient info, scan parameters, acquisition details
 - D. Archive storage code only
- ✓ **Answer: C. Patient info, scan parameters, acquisition details**
-

X-ray Physics & Equipment

1. **kVp** controls beam energy (penetration); **mAs** controls quantity (dose).
 2. **Increased SID** improves spatial resolution but reduces magnification.
 3. **Filtration** removes low-energy photons; improves beam quality.
 4. **Focal spot size** affects spatial resolution (smaller = sharper image).
 5. **Anode heel effect**: intensity is higher at cathode side.
-

Radiographic Techniques & Positioning

6. **PA chest** reduces heart magnification.
7. **Left lateral decubitus** best detects free intraperitoneal gas.
8. **Scaphoid view**: wrist in ulnar deviation.
9. **Open mouth (odontoid) view** for C1-C2.
10. **Swimmer's view**: lateral cervicothoracic junction.



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🔗 Radiation Protection & Safety

11. **ALARA**: As Low As Reasonably Achievable.
 12. Gonadal shielding is most effective in **pediatric** pelvis imaging.
 13. **Time, distance, shielding** = 3 principles of protection.
 14. **Lead apron thickness**: typically 0.5 mm Pb equivalent.
 15. Pregnant staff should avoid fluoroscopy exposure zones.
-

Contrast Media

16. **Non-ionic, low-osmolar agents** are safer and more commonly used.
 17. Risk of nephrotoxicity increases in **diabetics with renal dysfunction**.
 18. **Prehydration** helps reduce contrast-induced nephropathy.
 19. **Iodinated contrast** contraindicated in **thyroid storm, allergy, renal failure**.
 20. **Barium sulfate** is contraindicated in suspected perforation.
-

CT Image Acquisition & Protocols

21. **Pitch >1** reduces dose; **<1** increases overlap.
 22. **Scout scan** helps plan scan range.
 23. **Helical CT** offers faster scans and multiplanar reconstructions.
 24. **Slice thickness** affects **z-axis resolution**.
 25. **kVp** influences contrast; **mAs** affects dose.
-

CT Artifacts

26. **Beam hardening** causes cupping & dark bands.
27. **Ring artifact** from detector miscalibration.
28. **Motion artifacts** cause blurring and double images.
29. **Metal artifacts** appear as streaks; minimized with MAR.
30. **Windmill artifact**: high pitch helical scan + rotation.



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QA/QC in CT & Radiography

- 31. **Line pair phantom** used to check spatial resolution.
 - 32. **CTDIvol** = dose per slice; **DLP** = dose for scan length.
 - 33. **Water phantom** used for CT number calibration.
 - 34. **Air kerma** measures radiation output.
 - 35. QA should be done **daily, weekly, monthly** depending on the test.
-

PACS, RIS & DICOM

- 36. **PACS**: image storage, retrieval, viewing.
 - 37. **RIS**: scheduling, billing, reporting.
 - 38. **DICOM** ensures interoperability and standardized imaging.
 - 39. **HL7** integrates RIS and HIS with PACS.
 - 40. DICOM headers contain patient and image acquisition data.
-

Cross-sectional Anatomy & Physiology

- 41. **Liver HU** > spleen in normal scan.
 - 42. **Cortex HU** > **medulla** in contrast-enhanced CT.
 - 43. **Basal ganglia calcification** can be physiological in elderly.
 - 44. **Left renal vein** passes **anterior to aorta**, under SMA.
 - 45. **Circle of Willis** seen best on **CTA/MRA**.
-

Emergency Radiography & CT

- 46. **Spleen** is most commonly injured solid organ in trauma.
- 47. **Appendicitis** on CT: >6 mm, fat stranding, appendicolith.
- 48. **Pancreatic injuries** best seen in pancreatic phase.
- 49. **Pneumatosis intestinalis** = bowel ischemia.
- 50. **Bladder rupture** shows contrast leak into peritoneum.



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CT Reconstruction Techniques

- 51. **Filtered Back Projection (FBP)** = faster, noisier.
 - 52. **Iterative Reconstruction** = low noise, low dose.
 - 53. **Multiphanar Reconstruction (MPR)**: axial to coronal/sagittal.
 - 54. **3D volume rendering** used in angiography and ortho CT.
 - 55. **Bone algorithm** = high spatial resolution, low soft tissue detail.
-

CT Perfusion, Angiography & Advanced Imaging

- 56. **CT perfusion** evaluates cerebral blood flow (CBF), volume (CBV).
 - 57. **CTA** used for aneurysm, dissection, stenosis.
 - 58. **CT venography** used for DVT, dural sinus thrombosis.
 - 59. **Dual-energy CT** differentiates materials like uric acid vs calcium.
 - 60. **Perfusion maps** help in acute stroke decision-making.
-

Neuro CT & Stroke

- 61. **Hyperdense MCA sign** = early ischemia.
 - 62. **Loss of grey-white differentiation** = infarct.
 - 63. **Intraventricular hemorrhage** = bright HU in CSF space.
 - 64. **Midline shift** indicates mass effect.
 - 65. **Stroke protocol CT** includes NCCT, CTA, CTP.
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Cardiac CT & Thoracic Imaging

- 66. **Calcium scoring** uses non-contrast ECG-gated CT.
- 67. **CTA coronary** needs HR <65 bpm.
- 68. **Pulmonary embolism** best seen on **CTPA** in pulmonary artery.
- 69. **Aortic dissection** seen as intimal flap.
- 70. **Pericardial effusion** appears as fluid around heart on axial.



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MSK & Spine CT

- 71. **Jefferson fracture** = burst C1.
 - 72. **Hangman's fracture** = C2 pedicles.
 - 73. **Winking owl sign** = vertebral metastasis.
 - 74. **Fat-fluid level** in joint = intra-articular fracture.
 - 75. **Spondylolysis** = "collar on Scotty dog" sign.
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PET-CT & Hybrid Imaging

- 76. **FDG PET** reflects glucose metabolism.
 - 77. **PET-CT** combines anatomic (CT) and functional (PET) imaging.
 - 78. **PET-MRI** offers lower radiation and better soft tissue contrast.
 - 79. **Bladder activity** on PET due to FDG excretion.
 - 80. **Brown fat** may cause false positives on PET.
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Pediatric Radiology

- 81. **USG preferred** in infants to avoid radiation.
 - 82. **Pediatric CT** should use tube current modulation.
 - 83. **Intussusception** shows target or donut sign.
 - 84. **Hydrocephalus** = dilated ventricles on CT.
 - 85. **Lead apron shielding** essential in all pediatric imaging.
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Terminologies & Key HU Values

- 86. **Air** = -1000 HU
- 87. **Fat** = -100 to -50 HU
- 88. **Water** = 0 HU
- 89. **Soft tissue** = +30 to +60 HU
- 90. **Bone** = +700 to +1000 HU



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Miscellaneous Essentials

- 91. **Effective dose unit** = mSv
 - 92. **Scout scan** = pre-scan for planning
 - 93. **Window width** = contrast; **Level** = brightness
 - 94. **“Comb sign”** = Crohn’s disease
 - 95. **Accordion sign** = C. difficile colitis
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Remember These Tips

- 96. Use **thin slices** for high-resolution CT (HRCT).
 - 97. Always check for **contrast allergy** before injection.
 - 98. **DLP x conversion factor** gives effective dose.
 - 99. **Radiopaque foreign body** seen best on CT.
 - 100. Always verify clinical history and indication before imaging.**
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