

PRACTICE EXAM 3: ARRT RADIOGRAPHY SIMULATION (200 QUESTIONS)

This practice examination contains 200 scored-style questions based on the ARRT Radiography content specifications effective through February 28, 2027. Select the single best answer for each question. The actual examination also includes 30 unscored pilot questions. A scaled score of 75 is required to pass; it is not equivalent to a fixed raw percentage.

1. In simulation case 3-1, while orienting a new technologist, which factor most directly controls receptor exposure when other variables remain fixed?

- A. Patient name
- B. Anatomic marker
- C. mAs
- D. Room illumination

2. In simulation case 3-2, during a trauma-department case, for an upright PA chest projection, where is the central ray directed?

- A. Toward the iliac crest at L4
- B. Perpendicular to the receptor at approximately T7
- C. Through the wrist joint
- D. Tangential to the patella

3. In simulation case 3-3, while reviewing a repeat image, before beginning an examination, which action best verifies the correct patient?

- A. Ask the room number and proceed if it matches
- B. Confirm the examination only with a family member
- C. Use the patient's diagnosis as the sole identifier
- D. Use two approved patient identifiers and compare them with the order

4. In simulation case 3-4, during a mobile-imaging assignment, which interaction is the principal source of occupational scatter during routine radiography?

- A. Compton scattering in the patient
- B. Pair production in the detector
- C. Coherent emission from the console
- D. Photodisintegration in the collimator

5. In simulation case 3-5, in an outpatient scenario, what is the likely image effect of patient motion?

- A. Increased bit depth
- B. Reduced spatial resolution
- C. Improved edge sharpness
- D. Higher detector efficiency

6. In simulation case 3-6, while orienting a new technologist, why is the PA chest projection preferred over AP when the patient can stand?

- A. It increases heart magnification
- B. It excludes the lung apices
- C. It reduces apparent heart magnification
- D. It requires shallow inspiration

7. In simulation case 3-7, during a trauma-department case, a conscious adult extends an arm for a routine radiograph after the procedure is explained. What type of consent is demonstrated?

- A. Informed written consent
- B. Proxy consent
- C. Emergency consent
- D. Implied consent

8. In simulation case 3-8, while reviewing a repeat image, what happens to radiation intensity when distance from a point source doubles?

- A. It decreases to one fourth
- B. It decreases to one half
- C. It doubles
- D. It increases fourfold

9. In simulation case 3-9, during a mobile-imaging assignment, increasing OID while other geometry remains constant causes what change?

- A. Less magnification and greater detail
- B. No geometric change
- C. Greater magnification and reduced recorded detail
- D. Elimination of shape distortion

10. In simulation case 3-10, in an outpatient scenario, which breathing instruction is used for a routine upright chest exposure?

- A. Suspend after the second full inspiration
- B. Suspend after forceful expiration
- C. Breathe rapidly during exposure
- D. Use quiet breathing without suspension

11. In simulation case 3-11, while orienting a new technologist, which communication method is best when a patient has limited English proficiency?

- A. Rely on a young family member
- B. Speak louder using technical terms
- C. Proceed without further explanation
- D. Use a qualified medical interpreter

12. In simulation case 3-12, during a trauma-department case, a point-source exposure rate is 4 mGy per minute at 1 meter. What is the rate at 2 meters?

- A. 2 mGy per minute
- B. 1 mGy per minute
- C. 4 mGy per minute
- D. 8 mGy per minute

13. In simulation case 3-13, while reviewing a repeat image, what is the primary purpose of an anti-scatter grid?

- A. Increase the number of scattered photons
- B. Measure patient pulse rate
- C. Replace beam collimation
- D. Absorb scatter before it reaches the receptor

14. In simulation case 3-14, during a mobile-imaging assignment, which projection best demonstrates free intraperitoneal air when the patient cannot stand?

- A. Right lateral decubitus with a vertical beam
- B. Left lateral decubitus abdomen with a horizontal beam
- C. Supine abdomen with an angled beam
- D. Prone abdomen without beam restriction

15. In simulation case 3-15, in an outpatient scenario, which action is appropriate when transferring a weak patient from a wheelchair to the table?

- A. Pull upward using the patient's arms
- B. Ask the patient to hold the tube stand
- C. Use a gait belt and obtain adequate assistance
- D. Twist while lifting from the waist

16. In simulation case 3-16, while orienting a new technologist, which radiation effect is considered stochastic?

- A. Radiation-induced cancer
- B. Skin erythema above a threshold
- C. Temporary epilation above a threshold
- D. Lens opacity with increasing severity

17. In simulation case 3-17, during a trauma-department case, which detector characteristic describes conversion of incident x-ray energy into useful image signal?

- A. Source-to-image distance
- B. Focal track angle
- C. Anode rotation speed
- D. Detective quantum efficiency

18. In simulation case 3-18, while reviewing a repeat image, for an AP supine abdomen, the central ray is commonly directed at which landmark?

- A. The level of the iliac crests
- B. The jugular notch
- C. The mandibular angle
- D. The radial styloid

19. In simulation case 3-19, during a mobile-imaging assignment, which finding requires immediate attention before iodinated contrast administration?

- A. A healed wrist fracture
- B. A documented prior severe contrast reaction
- C. A normal respiratory rate
- D. A preference for warm blankets

20. In simulation case 3-20, in an outpatient scenario, which tissue is generally among the most radiosensitive?

- A. Mature skeletal muscle
- B. Adipose tissue
- C. Red bone marrow
- D. Peripheral nerve tissue

21. In simulation case 3-21, while orienting a new technologist, what does increased bit depth provide in a digital image?

- A. A greater number of available gray shades
- B. A larger focal spot
- C. A shorter exposure time automatically
- D. A smaller field of view

22. In simulation case 3-22, during a trauma-department case, which position best demonstrates the cervical intervertebral foramina on the side closest to the receptor?

- A. AP axial cervical position
- B. Open-mouth odontoid position
- C. Posterior oblique cervical position
- D. Lateral cervical position

23. In simulation case 3-23, while reviewing a repeat image, what is the most effective routine action for interrupting healthcare-associated transmission?

- A. Wear the same gloves between patients
- B. Perform hand hygiene at the indicated moments
- C. Disinfect equipment only at day end
- D. Recap all used needles before disposal

24. In simulation case 3-24, during a mobile-imaging assignment, what is the SI unit of absorbed dose?

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

25. In simulation case 3-25, in an outpatient scenario, which action is essential when using automatic exposure control?

- A. Collimate away from every chamber
- B. Select all chambers for every projection
- C. Ignore patient centering
- D. Place the anatomy over the selected detector chamber

26. In simulation case 3-26, while orienting a new technologist, what is the purpose of the open-mouth odontoid projection?

- A. Demonstrate the lumbar zygapophyseal joints
- B. Show C1, C2, and the dens through the mouth
- C. Demonstrate the sternoclavicular joints
- D. Demonstrate the distal tibiofibular joint

27. In simulation case 3-27, during a trauma-department case, which item belongs in a puncture-resistant sharps container immediately after use?

- A. An uncapped contaminated needle
- B. A clean paper wrapper
- C. An unused gauze pad
- D. A disposable patient gown

28. In simulation case 3-28, while reviewing a repeat image, which action best applies distance protection during mobile radiography?

- A. Stand beside the patient without a barrier
- B. Hold the image receptor by hand
- C. Stand as far from the patient and tube as practical
- D. Aim the beam toward nearby personnel

29. In simulation case 3-29, during a mobile-imaging assignment, what is quantum mottle most commonly associated with?

- A. Excessive matrix dimensions alone
- B. Insufficient detected photon signal
- C. Perfect receptor calibration
- D. An oversized anatomical marker

30. In simulation case 3-30, in an outpatient scenario, which projection demonstrates the lumbar intervertebral foramina?

- A. AP lumbar spine
- B. Oblique lumbar spine
- C. Lateral lumbar spine
- D. AP axial sacrum

31. In simulation case 3-31, while orienting a new technologist, a patient becomes pale, diaphoretic, and unresponsive. What should the radiographer do first?

- A. Assess responsiveness and activate the emergency response process
- B. Finish the exposure before responding
- C. Leave the patient standing alone
- D. Offer oral contrast immediately

32. In simulation case 3-32, during a trauma-department case, an exposure uses 300 mA for 0.04 second. What mAs is produced?

- A. 7.5 mAs
- B. 75 mAs
- C. 120 mAs
- D. 12 mAs

33. In simulation case 3-33, while reviewing a repeat image, which system standard supports communication of medical images and related information?

- A. AED
- B. ALARA
- C. SDS
- D. DICOM

34. In simulation case 3-34, during a mobile-imaging assignment, what anatomy is highlighted by an oblique lumbar spine projection?

- A. Intervertebral foramina
- B. Zygapophyseal joints
- C. Odontoid process
- D. Sternoclavicular joints

35. In simulation case 3-35, in an outpatient scenario, which action maintains a sterile field?

- A. Keep sterile objects above waist level and within view
- B. Reach across the sterile field
- C. Turn away from the open field
- D. Allow a wet area to remain sterile

36. In simulation case 3-36, while orienting a new technologist, which device is appropriate for monitoring cumulative occupational exposure?

- A. A lead anatomical marker
- B. A digital image receptor
- C. A properly assigned personnel dosimeter
- D. A radiographic grid

37. In simulation case 3-37, during a trauma-department case, what is the function of a lookup table in digital processing?

- A. Physically rotate the anode
- B. Measure patient blood pressure
- C. Collimate the primary beam
- D. Map stored values to displayed brightness or grayscale

38. In simulation case 3-38, while reviewing a repeat image, for an AP pelvis, why are the lower limbs internally rotated when trauma is not suspected?

- A. To superimpose the greater trochanters completely
- B. To place the femoral necks parallel with the receptor
- C. To increase pelvic rotation
- D. To demonstrate the knees in lateral position

39. In simulation case 3-39, during a mobile-imaging assignment, a patient reports pain and swelling at an IV site during injection. What is the best immediate response?

- A. Stop the injection and assess for extravasation
- B. Increase the injection pressure
- C. Massage the site forcefully
- D. Continue until the ordered volume is delivered

40. In simulation case 3-40, in an outpatient scenario, what is the principal purpose of added filtration?

- A. Remove low-energy photons from the useful beam
- B. Increase geometric magnification
- C. Create more scatter in the patient
- D. Shorten the source-to-image distance

41. In simulation case 3-41, while orienting a new technologist, which change improves geometric sharpness?

- A. Increase object-to-image distance
- B. Decrease source-to-image distance
- C. Use a smaller focal spot
- D. Permit voluntary motion

42. In simulation case 3-42, during a trauma-department case, which projection is commonly used to demonstrate a suspected hip fracture without moving the affected limb?

- A. Frog-leg lateral projection
- B. Weight-bearing AP knee
- C. Tangential patella projection
- D. Axiolateral inferosuperior projection

43. In simulation case 3-43, while reviewing a repeat image, which documentation entry is most appropriate after a patient falls?

- A. Assign blame to a specific employee
- B. Delete the original clinical note
- C. Record objective observations and actions taken
- D. Document assumptions about intent

44. In simulation case 3-44, during a mobile-imaging assignment, which statement correctly describes bremsstrahlung production?

- A. A neutron is absorbed by the detector
- B. An electron changes direction near a nucleus and emits energy
- C. An orbital electron emits ultrasound
- D. A photon splits without nuclear interaction

45. In simulation case 3-45, in an outpatient scenario, what is the purpose of detector calibration?

- A. Correct nonuniform detector response
- B. Change the patient's anatomy
- C. Replace accurate positioning
- D. Increase scatter production

46. In simulation case 3-46, while orienting a new technologist, which projection best demonstrates the scaphoid without foreshortening?

- A. PA wrist with radial deviation
- B. Lateral forearm
- C. AP elbow in flexion
- D. PA wrist with ulnar deviation

47. In simulation case 3-47, during a trauma-department case, for a patient with suspected airborne infection, which control is appropriate?

- A. Use only clean exam gloves
- B. Place the patient beside an open doorway
- C. Use an airborne-infection isolation room and required respirator
- D. Substitute a surgical cap for respiratory protection

48. In simulation case 3-48, while reviewing a repeat image, which practice minimizes fluoroscopic dose?

- A. Use magnification continuously
- B. Use pulsed fluoroscopy and last-image hold when suitable
- C. Keep the beam on while repositioning
- D. Increase field size beyond the anatomy

49. In simulation case 3-49, during a mobile-imaging assignment, during a competency review, which factor most directly controls receptor exposure when other variables remain fixed?

- A. Patient name
- B. Anatomic marker
- C. Room illumination
- D. mAs

50. In simulation case 3-50, in an outpatient scenario, which elbow projection demonstrates the radial head with minimal superimposition?

- A. AP oblique with medial rotation
- B. AP oblique with lateral rotation
- C. Acute flexion AP projection
- D. Routine lateral without flexion

51. In simulation case 3-51, while orienting a new technologist, during a competency review, before beginning an examination, which action best verifies the correct patient?

- A. Ask the room number and proceed if it matches
- B. Confirm the examination only with a family member
- C. Use two approved patient identifiers and compare them with the order
- D. Use the patient's diagnosis as the sole identifier

52. In simulation case 3-52, during a trauma-department case, a technique uses 10 mAs at 100 cm SID. Approximately what mAs maintains receptor exposure at 180 cm SID?

- A. 32.4 mAs
- B. 18 mAs
- C. 22.5 mAs
- D. 36 mAs

53. In simulation case 3-53, while reviewing a repeat image, during a competency review, what is the likely image effect of patient motion?

- A. Reduced spatial resolution
- B. Increased bit depth
- C. Improved edge sharpness
- D. Higher detector efficiency

54. In simulation case 3-54, during a mobile-imaging assignment, for a lateral elbow, what flexion is generally required when the patient's condition permits?

- A. Ten degrees
- B. Thirty degrees
- C. One hundred eighty degrees
- D. Ninety degrees

55. In simulation case 3-55, in an outpatient scenario, during a competency review, a conscious adult extends an arm for a routine radiograph after the procedure is explained. What type of consent is demonstrated?

- A. Informed written consent
- B. Implied consent
- C. Proxy consent
- D. Emergency consent

56. In simulation case 3-56, while orienting a new technologist, during a competency review, what happens to radiation intensity when distance from a point source doubles?

- A. It decreases to one half
- B. It doubles
- C. It decreases to one fourth
- D. It increases fourfold

57. In simulation case 3-57, during a trauma-department case, during a competency review, increasing OID while other geometry remains constant causes what change?

- A. Less magnification and greater detail
- B. No geometric change
- C. Elimination of shape distortion
- D. Greater magnification and reduced recorded detail

58. In simulation case 3-58, while reviewing a repeat image, which shoulder projection demonstrates the glenoid cavity in profile?

- A. AP external-rotation shoulder
- B. AP oblique Grashey projection
- C. Inferosuperior axial shoulder
- D. Transthoracic lateral humerus

59. In simulation case 3-59, during a mobile-imaging assignment, during a competency review, which communication method is best when a patient has limited English proficiency?

- A. Rely on a young family member
- B. Speak louder using technical terms
- C. Use a qualified medical interpreter
- D. Proceed without further explanation

60. In simulation case 3-60, in an outpatient scenario, during a competency review, which exposure adjustment most directly reduces photon quantity while holding other factors constant?

- A. Decrease mAs
- B. Increase kVp
- C. Decrease SID
- D. Increase field size

61. In simulation case 3-61, while orienting a new technologist, during a competency review, what is the primary purpose of an anti-scatter grid?

- A. Increase the number of scattered photons
- B. Absorb scatter before it reaches the receptor
- C. Measure patient pulse rate
- D. Replace beam collimation

62. In simulation case 3-62, during a trauma-department case, which projection can demonstrate shoulder dislocation when abduction is contraindicated?

- A. Scapular Y lateral
- B. Inferosuperior axial
- C. AP clavicle
- D. Tangential intertubercular groove

63. In simulation case 3-63, while reviewing a repeat image, during a competency review, which action is appropriate when transferring a weak patient from a wheelchair to the table?

- A. Pull upward using the patient's arms
- B. Ask the patient to hold the tube stand
- C. Twist while lifting from the waist
- D. Use a gait belt and obtain adequate assistance

64. In simulation case 3-64, during a mobile-imaging assignment, during a competency review, which radiation effect is considered stochastic?

- A. Skin erythema above a threshold
- B. Temporary epilation above a threshold
- C. Radiation-induced cancer
- D. Lens opacity with increasing severity

65. In simulation case 3-65, in an outpatient scenario, during a competency review, which detector characteristic describes conversion of incident x-ray energy into useful image signal?

- A. Source-to-image distance
- B. Focal track angle
- C. Anode rotation speed
- D. Detective quantum efficiency

66. In simulation case 3-66, while orienting a new technologist, for an AP knee, where should the central ray be centered?

- A. Approximately one-half inch below the patellar apex
- B. At the greater trochanter
- C. At the medial malleolus
- D. At the anterior superior iliac spine

67. In simulation case 3-67, during a trauma-department case, during a competency review, which finding requires immediate attention before iodinated contrast administration?

- A. A healed wrist fracture
- B. A documented prior severe contrast reaction
- C. A normal respiratory rate
- D. A preference for warm blankets

68. In simulation case 3-68, while reviewing a repeat image, during a competency review, which tissue is generally among the most radiosensitive?

- A. Mature skeletal muscle
- B. Adipose tissue
- C. Red bone marrow
- D. Peripheral nerve tissue

69. In simulation case 3-69, during a mobile-imaging assignment, during a competency review, what does increased bit depth provide in a digital image?

- A. A larger focal spot
- B. A shorter exposure time automatically
- C. A smaller field of view
- D. A greater number of available gray shades

70. In simulation case 3-70, in an outpatient scenario, which projection demonstrates the patellofemoral joint space tangentially?

- A. AP weight-bearing knee
- B. Lateral knee
- C. Sunrise or merchant-type projection
- D. AP oblique knee

71. In simulation case 3-71, while orienting a new technologist, during a competency review, what is the most effective routine action for interrupting healthcare-associated transmission?

- A. Wear the same gloves between patients
- B. Perform hand hygiene at the indicated moments
- C. Disinfect equipment only at day end
- D. Recap all used needles before disposal

72. In simulation case 3-72, during a trauma-department case, an 80-unit beam passes through three half-value layers. What intensity remains?

- A. 10 units
- B. 20 units
- C. 30 units
- D. 40 units

73. In simulation case 3-73, while reviewing a repeat image, during a competency review, which action is essential when using automatic exposure control?

- A. Place the anatomy over the selected detector chamber
- B. Collimate away from every chamber
- C. Select all chambers for every projection
- D. Ignore patient centering

74. In simulation case 3-74, during a mobile-imaging assignment, which ankle projection best demonstrates the mortise joint uniformly open?

- A. AP ankle without rotation
- B. AP oblique with 15–20° medial rotation
- C. Lateral ankle with plantar flexion
- D. AP oblique with lateral rotation

75. In simulation case 3-75, in an outpatient scenario, during a competency review, which item belongs in a puncture-resistant sharps container immediately after use?

- A. A clean paper wrapper
- B. An unused gauze pad
- C. A disposable patient gown
- D. An uncapped contaminated needle

76. In simulation case 3-76, while orienting a new technologist, during a competency review, which action best applies distance protection during mobile radiography?

- A. Stand beside the patient without a barrier
- B. Hold the image receptor by hand
- C. Stand as far from the patient and tube as practical
- D. Aim the beam toward nearby personnel

77. In simulation case 3-77, during a trauma-department case, during a competency review, what is quantum mottle most commonly associated with?

- A. Excessive matrix dimensions alone
- B. Insufficient detected photon signal
- C. Perfect receptor calibration
- D. An oversized anatomical marker

78. In simulation case 3-78, while reviewing a repeat image, for a lateral foot, which surface is generally placed against the receptor?

- A. The affected lateral surface
- B. The plantar surface only
- C. The anterior tibial surface
- D. The opposite medial knee

79. In simulation case 3-79, during a mobile-imaging assignment, during a competency review, a patient becomes pale, diaphoretic, and unresponsive. What should the radiographer do first?

- A. Finish the exposure before responding
- B. Leave the patient standing alone
- C. Assess responsiveness and activate the emergency response process
- D. Offer oral contrast immediately

80. In simulation case 3-80, in an outpatient scenario, during a competency review, why is beam collimation important?

- A. It increases focal spot size
- B. It eliminates the need for positioning
- C. It guarantees correct receptor exposure
- D. It reduces patient volume irradiated and scatter production

81. In simulation case 3-81, while orienting a new technologist, during a competency review, which system standard supports communication of medical images and related information?

- A. AED
- B. DICOM
- C. ALARA
- D. SDS

82. In simulation case 3-82, during a trauma-department case, which projection best demonstrates the calcaneus without superimposition by the talus?

- A. AP ankle
- B. Lateral knee
- C. PA axial skull
- D. Plantodorsal axial calcaneus

83. In simulation case 3-83, while reviewing a repeat image, during a competency review, which action maintains a sterile field?

- A. Keep sterile objects above waist level and within view
- B. Reach across the sterile field
- C. Turn away from the open field
- D. Allow a wet area to remain sterile

84. In simulation case 3-84, during a mobile-imaging assignment, during a competency review, which device is appropriate for monitoring cumulative occupational exposure?

- A. A lead anatomical marker
- B. A digital image receptor
- C. A properly assigned personnel dosimeter
- D. A radiographic grid

85. In simulation case 3-85, in an outpatient scenario, during a competency review, what is the function of a lookup table in digital processing?

- A. Map stored values to displayed brightness or grayscale
- B. Physically rotate the anode
- C. Measure patient blood pressure
- D. Collimate the primary beam

86. In simulation case 3-86, while orienting a new technologist, which projection demonstrates the intercondylar fossa of the knee?

- A. AP knee
- B. PA axial tunnel projection
- C. Lateral knee
- D. Tangential patella

87. In simulation case 3-87, during a trauma-department case, during a competency review, a patient reports pain and swelling at an IV site during injection. What is the best immediate response?

- A. Increase the injection pressure
- B. Massage the site forcefully
- C. Stop the injection and assess for extravasation
- D. Continue until the ordered volume is delivered

88. In simulation case 3-88, while reviewing a repeat image, during a competency review, what is the principal purpose of added filtration?

- A. Increase geometric magnification
- B. Create more scatter in the patient
- C. Shorten the source-to-image distance
- D. Remove low-energy photons from the useful beam

89. In simulation case 3-89, during a mobile-imaging assignment, during a competency review, which change improves geometric sharpness?

- A. Use a smaller focal spot
- B. Increase object-to-image distance
- C. Decrease source-to-image distance
- D. Permit voluntary motion

90. In simulation case 3-90, in an outpatient scenario, for a lateral cervical spine, what helps demonstrate C7-T1?

- A. Elevate both shoulders toward the ears
- B. Rotate the head forty-five degrees
- C. Depress the shoulders while maintaining a true lateral
- D. Flex the knees against the receptor

91. In simulation case 3-91, while orienting a new technologist, during a competency review, which documentation entry is most appropriate after a patient falls?

- A. Assign blame to a specific employee
- B. Record objective observations and actions taken
- C. Delete the original clinical note
- D. Document assumptions about intent

92. In simulation case 3-92, during a trauma-department case, with an SID of 100 cm and an SOD of 80 cm, what is the magnification factor?

- A. 0.80
- B. 1.80
- C. 2.25
- D. 1.25

93. In simulation case 3-93, while reviewing a repeat image, during a competency review, what is the purpose of detector calibration?

- A. Correct nonuniform detector response
- B. Change the patient's anatomy
- C. Replace accurate positioning
- D. Increase scatter production

94. In simulation case 3-94, during a mobile-imaging assignment, which projection demonstrates the sacroiliac joint farthest from the receptor?

- A. Anterior oblique pelvis
- B. Lateral sacrum
- C. Posterior oblique pelvis
- D. AP axial coccyx

95. In simulation case 3-95, in an outpatient scenario, during a competency review, for a patient with suspected airborne infection, which control is appropriate?

- A. Use only clean exam gloves
- B. Place the patient beside an open doorway
- C. Substitute a surgical cap for respiratory protection
- D. Use an airborne-infection isolation room and required respirator

96. In simulation case 3-96, while orienting a new technologist, during a competency review, which practice minimizes fluoroscopic dose?

- A. Use magnification continuously
- B. Use pulsed fluoroscopy and last-image hold when suitable
- C. Keep the beam on while repositioning
- D. Increase field size beyond the anatomy

97. In simulation case 3-97, during a trauma-department case, for a repeat examination scenario, which factor most directly controls receptor exposure when other variables remain fixed?

- A. Patient name
- B. Anatomic marker
- C. mAs
- D. Room illumination

98. In simulation case 3-98, while reviewing a repeat image, during a competency review, for an upright PA chest projection, where is the central ray directed?

- A. Perpendicular to the receptor at approximately T7
- B. Toward the iliac crest at L4
- C. Through the wrist joint
- D. Tangential to the patella

99. In simulation case 3-99, during a mobile-imaging assignment, for a repeat examination scenario, before beginning an examination, which action best verifies the correct patient?

- A. Ask the room number and proceed if it matches
- B. Use two approved patient identifiers and compare them with the order
- C. Confirm the examination only with a family member
- D. Use the patient's diagnosis as the sole identifier

100. In simulation case 3-100, in an outpatient scenario, for a repeat examination scenario, which interaction is the principal source of occupational scatter during routine radiography?

- A. Pair production in the detector
- B. Coherent emission from the console
- C. Photodisintegration in the collimator
- D. Compton scattering in the patient

101. In simulation case 3-101, while orienting a new technologist, for a repeat examination scenario, what is the likely image effect of patient motion?

- A. Increased bit depth
- B. Improved edge sharpness
- C. Higher detector efficiency
- D. Reduced spatial resolution

102. In simulation case 3-102, during a trauma-department case, during a competency review, why is the PA chest projection preferred over AP when the patient can stand?

- A. It increases heart magnification
- B. It excludes the lung apices
- C. It reduces apparent heart magnification
- D. It requires shallow inspiration

103. In simulation case 3-103, while reviewing a repeat image, for a repeat examination scenario, a conscious adult extends an arm for a routine radiograph after the procedure is explained. What type of consent is demonstrated?

- A. Implied consent
- B. Informed written consent
- C. Proxy consent
- D. Emergency consent

104. In simulation case 3-104, during a mobile-imaging assignment, for a repeat examination scenario, what happens to radiation intensity when distance from a point source doubles?

- A. It decreases to one half
- B. It decreases to one fourth
- C. It doubles
- D. It increases fourfold

105. In simulation case 3-105, in an outpatient scenario, for a repeat examination scenario, increasing OID while other geometry remains constant causes what change?

- A. Less magnification and greater detail
- B. Greater magnification and reduced recorded detail
- C. No geometric change
- D. Elimination of shape distortion

106. In simulation case 3-106, while orienting a new technologist, during a competency review, which breathing instruction is used for a routine upright chest exposure?

- A. Suspend after the second full inspiration
- B. Suspend after forceful expiration
- C. Breathe rapidly during exposure
- D. Use quiet breathing without suspension

107. In simulation case 3-107, during a trauma-department case, for a repeat examination scenario, which communication method is best when a patient has limited English proficiency?

- A. Rely on a young family member
- B. Speak louder using technical terms
- C. Proceed without further explanation
- D. Use a qualified medical interpreter

108. In simulation case 3-108, while reviewing a repeat image, for a repeat examination scenario, which exposure adjustment most directly reduces photon quantity while holding other factors constant?

- A. Increase kVp
- B. Decrease SID
- C. Decrease mAs
- D. Increase field size

109. In simulation case 3-109, during a mobile-imaging assignment, for a repeat examination scenario, what is the primary purpose of an anti-scatter grid?

- A. Increase the number of scattered photons
- B. Absorb scatter before it reaches the receptor
- C. Measure patient pulse rate
- D. Replace beam collimation

110. In simulation case 3-110, in an outpatient scenario, during a competency review, which projection best demonstrates free intraperitoneal air when the patient cannot stand?

- A. Right lateral decubitus with a vertical beam
- B. Supine abdomen with an angled beam
- C. Prone abdomen without beam restriction

D. Left lateral decubitus abdomen with a horizontal beam

111. In simulation case 3-111, while orienting a new technologist, for a repeat examination scenario, which action is appropriate when transferring a weak patient from a wheelchair to the table?

- A. Pull upward using the patient's arms
- B. Ask the patient to hold the tube stand
- C. Use a gait belt and obtain adequate assistance
- D. Twist while lifting from the waist

112. In simulation case 3-112, during a trauma-department case, a 6:1 grid technique uses 10 mAs. Using conversion factors 3 for 6:1 and 5 for 12:1, what mAs is needed for a 12:1 grid?

- A. 16.7 mAs
- B. 6.0 mAs
- C. 13.3 mAs
- D. 50.0 mAs

113. In simulation case 3-113, while reviewing a repeat image, for a repeat examination scenario, which detector characteristic describes conversion of incident x-ray energy into useful image signal?

- A. Source-to-image distance
- B. Focal track angle
- C. Detective quantum efficiency
- D. Anode rotation speed

114. In simulation case 3-114, during a mobile-imaging assignment, during a competency review, for an AP supine abdomen, the central ray is commonly directed at which landmark?

- A. The jugular notch
- B. The mandibular angle

- C. The radial styloid
- D. The level of the iliac crests

115. In simulation case 3-115, in an outpatient scenario, for a repeat examination scenario, which finding requires immediate attention before iodinated contrast administration?

- A. A healed wrist fracture
- B. A documented prior severe contrast reaction
- C. A normal respiratory rate
- D. A preference for warm blankets

116. In simulation case 3-116, while orienting a new technologist, for a repeat examination scenario, which tissue is generally among the most radiosensitive?

- A. Red bone marrow
- B. Mature skeletal muscle
- C. Adipose tissue
- D. Peripheral nerve tissue

117. In simulation case 3-117, during a trauma-department case, for a repeat examination scenario, what does increased bit depth provide in a digital image?

- A. A greater number of available gray shades
- B. A larger focal spot
- C. A shorter exposure time automatically
- D. A smaller field of view

118. In simulation case 3-118, while reviewing a repeat image, during a competency review, which position best demonstrates the cervical intervertebral foramina on the side closest to the receptor?

- A. AP axial cervical position

- B. Open-mouth odontoid position
- C. Posterior oblique cervical position
- D. Lateral cervical position

119. In simulation case 3-119, during a mobile-imaging assignment, for a repeat examination scenario, what is the most effective routine action for interrupting healthcare-associated transmission?

- A. Wear the same gloves between patients
- B. Disinfect equipment only at day end
- C. Recap all used needles before disposal
- D. Perform hand hygiene at the indicated moments

120. In simulation case 3-120, in an outpatient scenario, for a repeat examination scenario, what is the SI unit of absorbed dose?

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

121. In simulation case 3-121, while orienting a new technologist, for a repeat examination scenario, which action is essential when using automatic exposure control?

- A. Collimate away from every chamber
- B. Select all chambers for every projection
- C. Place the anatomy over the selected detector chamber
- D. Ignore patient centering

122. In simulation case 3-122, during a trauma-department case, during a competency review, what is the purpose of the open-mouth odontoid projection?

- A. Demonstrate the lumbar zygapophyseal joints
- B. Demonstrate the sternoclavicular joints
- C. Demonstrate the distal tibiofibular joint
- D. Show C1, C2, and the dens through the mouth

123. In simulation case 3-123, while reviewing a repeat image, for a repeat examination scenario, which item belongs in a puncture-resistant sharps container immediately after use?

- A. An uncapped contaminated needle
- B. A clean paper wrapper
- C. An unused gauze pad
- D. A disposable patient gown

124. In simulation case 3-124, during a mobile-imaging assignment, for a repeat examination scenario, which action best applies distance protection during mobile radiography?

- A. Stand beside the patient without a barrier
- B. Stand as far from the patient and tube as practical
- C. Hold the image receptor by hand
- D. Aim the beam toward nearby personnel

125. In simulation case 3-125, in an outpatient scenario, for a repeat examination scenario, what is quantum mottle most commonly associated with?

- A. Excessive matrix dimensions alone
- B. Insufficient detected photon signal
- C. Perfect receptor calibration
- D. An oversized anatomical marker

126. In simulation case 3-126, while orienting a new technologist, during a competency review, which projection demonstrates the lumbar intervertebral foramina?

- A. Lateral lumbar spine
- B. AP lumbar spine
- C. Oblique lumbar spine
- D. AP axial sacrum

127. In simulation case 3-127, during a trauma-department case, for a repeat examination scenario, a patient becomes pale, diaphoretic, and unresponsive. What should the radiographer do first?

- A. Finish the exposure before responding
- B. Leave the patient standing alone
- C. Offer oral contrast immediately
- D. Assess responsiveness and activate the emergency response process

128. In simulation case 3-128, while reviewing a repeat image, for a repeat examination scenario, why is beam collimation important?

- A. It increases focal spot size
- B. It eliminates the need for positioning
- C. It reduces patient volume irradiated and scatter production
- D. It guarantees correct receptor exposure

129. In simulation case 3-129, during a mobile-imaging assignment, for a repeat examination scenario, which system standard supports communication of medical images and related information?

- A. DICOM
- B. AED
- C. ALARA
- D. SDS

130. In simulation case 3-130, in an outpatient scenario, during a competency review, what anatomy is highlighted by an oblique lumbar spine projection?

- A. Intervertebral foramina
- B. Odontoid process
- C. Sternoclavicular joints
- D. Zygapophyseal joints

131. In simulation case 3-131, while orienting a new technologist, for a repeat examination scenario, which action maintains a sterile field?

- A. Reach across the sterile field
- B. Keep sterile objects above waist level and within view
- C. Turn away from the open field
- D. Allow a wet area to remain sterile

132. In simulation case 3-132, during a trauma-department case, a single-phase exposure uses 80 kVp, 200 mA, and 0.10 second. How many heat units are produced?

- A. 160 heat units
- B. 800 heat units
- C. 1,600 heat units
- D. 16,000 heat units

133. In simulation case 3-133, while reviewing a repeat image, for a repeat examination scenario, what is the function of a lookup table in digital processing?

- A. Map stored values to displayed brightness or grayscale
- B. Physically rotate the anode
- C. Measure patient blood pressure
- D. Collimate the primary beam

134. In simulation case 3-134, during a mobile-imaging assignment, during a competency review, for an AP pelvis, why are the lower limbs internally rotated when trauma is not suspected?

- A. To superimpose the greater trochanters completely
- B. To increase pelvic rotation
- C. To place the femoral necks parallel with the receptor
- D. To demonstrate the knees in lateral position

135. In simulation case 3-135, in an outpatient scenario, for a repeat examination scenario, what is the principal purpose of added filtration?

- A. Increase geometric magnification
- B. Create more scatter in the patient
- C. Shorten the source-to-image distance
- D. Remove low-energy photons from the useful beam

136. In simulation case 3-136, while orienting a new technologist, for a repeat examination scenario, which change improves geometric sharpness?

- A. Increase object-to-image distance
- B. Use a smaller focal spot
- C. Decrease source-to-image distance
- D. Permit voluntary motion

137. In simulation case 3-137, during a trauma-department case, during a competency review, which projection is commonly used to demonstrate a suspected hip fracture without moving the affected limb?

- A. Frog-leg lateral projection
- B. Weight-bearing AP knee
- C. Axiolateral inferosuperior projection
- D. Tangential patella projection

138. In simulation case 3-138, while reviewing a repeat image, for a repeat examination scenario, which statement correctly describes bremsstrahlung production?

- A. A neutron is absorbed by the detector
- B. An electron changes direction near a nucleus and emits energy
- C. An orbital electron emits ultrasound
- D. A photon splits without nuclear interaction

139. In simulation case 3-139, during a mobile-imaging assignment, for a repeat examination scenario, what is the purpose of detector calibration?

- A. Correct nonuniform detector response
- B. Change the patient's anatomy
- C. Replace accurate positioning
- D. Increase scatter production

140. In simulation case 3-140, in an outpatient scenario, during a competency review, which projection best demonstrates the scaphoid without foreshortening?

- A. PA wrist with radial deviation
- B. Lateral forearm
- C. AP elbow in flexion
- D. PA wrist with ulnar deviation

141. In simulation case 3-141, while orienting a new technologist, for a repeat examination scenario, which practice minimizes fluoroscopic dose?

- A. Use magnification continuously
- B. Keep the beam on while repositioning
- C. Use pulsed fluoroscopy and last-image hold when suitable
- D. Increase field size beyond the anatomy

142. In simulation case 3-142, during a trauma-department case, while preparing an adult patient, which factor most directly controls receptor exposure when other variables remain fixed?

- A. Patient name
- B. Anatomic marker
- C. Room illumination
- D. mAs

143. In simulation case 3-143, while reviewing a repeat image, during a competency review, which elbow projection demonstrates the radial head with minimal superimposition?

- A. AP oblique with medial rotation
- B. AP oblique with lateral rotation
- C. Acute flexion AP projection
- D. Routine lateral without flexion

144. In simulation case 3-144, during a mobile-imaging assignment, while preparing an adult patient, which interaction is the principal source of occupational scatter during routine radiography?

- A. Compton scattering in the patient
- B. Pair production in the detector
- C. Coherent emission from the console
- D. Photodisintegration in the collimator

145. In simulation case 3-145, in an outpatient scenario, while preparing an adult patient, what is the likely image effect of patient motion?

- A. Increased bit depth
- B. Reduced spatial resolution
- C. Improved edge sharpness
- D. Higher detector efficiency

146. In simulation case 3-146, while orienting a new technologist, during a competency review, for a lateral elbow, what flexion is generally required when the patient's condition permits?

- A. Ten degrees
- B. Thirty degrees
- C. One hundred eighty degrees
- D. Ninety degrees

147. In simulation case 3-147, during a trauma-department case, an exposure uses 400 mA for 0.025 second. What is the mAs?

- A. 10 mAs
- B. 1 mAs
- C. 16 mAs
- D. 100 mAs

148. In simulation case 3-148, while reviewing a repeat image, while preparing an adult patient, increasing OID while other geometry remains constant causes what change?

- A. Less magnification and greater detail
- B. No geometric change
- C. Greater magnification and reduced recorded detail
- D. Elimination of shape distortion

149. In simulation case 3-149, during a mobile-imaging assignment, during a competency review, which shoulder projection demonstrates the glenoid cavity in profile?

- A. AP external-rotation shoulder
- B. Inferosuperior axial shoulder
- C. Transthoracic lateral humerus
- D. AP oblique Grashey projection

150. In simulation case 3-150, in an outpatient scenario, while preparing an adult patient, which exposure adjustment most directly reduces photon quantity while holding other factors constant?

- A. Decrease mAs
- B. Increase kVp
- C. Decrease SID
- D. Increase field size

151. In simulation case 3-151, while orienting a new technologist, while preparing an adult patient, what is the primary purpose of an anti-scatter grid?

- A. Increase the number of scattered photons
- B. Absorb scatter before it reaches the receptor
- C. Measure patient pulse rate
- D. Replace beam collimation

152. In simulation case 3-152, during a trauma-department case, during a competency review, which projection can demonstrate shoulder dislocation when abduction is contraindicated?

- A. Inferosuperior axial
- B. AP clavicle
- C. Scapular Y lateral
- D. Tangential intertubercular groove

153. In simulation case 3-153, while reviewing a repeat image, while preparing an adult patient, which radiation effect is considered stochastic?

- A. Skin erythema above a threshold
- B. Radiation-induced cancer
- C. Temporary epilation above a threshold
- D. Lens opacity with increasing severity

154. In simulation case 3-154, during a mobile-imaging assignment, while preparing an adult patient, which detector characteristic describes conversion of incident x-ray energy into useful image signal?

- A. Source-to-image distance
- B. Focal track angle
- C. Detective quantum efficiency
- D. Anode rotation speed

155. In simulation case 3-155, in an outpatient scenario, during a competency review, for an AP knee, where should the central ray be centered?

- A. At the greater trochanter
- B. At the medial malleolus
- C. At the anterior superior iliac spine
- D. Approximately one-half inch below the patellar apex

156. In simulation case 3-156, while orienting a new technologist, while preparing an adult patient, which tissue is generally among the most radiosensitive?

- A. Red bone marrow
- B. Mature skeletal muscle
- C. Adipose tissue
- D. Peripheral nerve tissue

157. In simulation case 3-157, during a trauma-department case, while preparing an adult patient, what does increased bit depth provide in a digital image?

- A. A larger focal spot
- B. A greater number of available gray shades
- C. A shorter exposure time automatically
- D. A smaller field of view

158. In simulation case 3-158, while reviewing a repeat image, during a competency review, which projection demonstrates the patellofemoral joint space tangentially?

- A. AP weight-bearing knee
- B. Lateral knee
- C. AP oblique knee
- D. Sunrise or merchant-type projection

159. In simulation case 3-159, during a mobile-imaging assignment, while preparing an adult patient, what is the SI unit of absorbed dose?

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

160. In simulation case 3-160, in an outpatient scenario, while preparing an adult patient, which action is essential when using automatic exposure control?

- A. Collimate away from every chamber
- B. Select all chambers for every projection
- C. Place the anatomy over the selected detector chamber
- D. Ignore patient centering

161. In simulation case 3-161, while orienting a new technologist, during a competency review, which ankle projection best demonstrates the mortise joint uniformly open?

- A. AP ankle without rotation
- B. AP oblique with 15–20° medial rotation
- C. Lateral ankle with plantar flexion
- D. AP oblique with lateral rotation

162. In simulation case 3-162, during a trauma-department case, a measured exposure is 9 mGy at 1 meter. What exposure is expected at 3 meters?

- A. 3 mGy
- B. 6 mGy
- C. 1 mGy
- D. 27 mGy

163. In simulation case 3-163, while reviewing a repeat image, while preparing an adult patient, what is quantum mottle most commonly associated with?

- A. Insufficient detected photon signal
- B. Excessive matrix dimensions alone
- C. Perfect receptor calibration
- D. An oversized anatomical marker

164. In simulation case 3-164, during a mobile-imaging assignment, during a competency review, for a lateral foot, which surface is generally placed against the receptor?

- A. The plantar surface only
- B. The anterior tibial surface
- C. The opposite medial knee
- D. The affected lateral surface

165. In simulation case 3-165, in an outpatient scenario, while preparing an adult patient, why is beam collimation important?

- A. It increases focal spot size
- B. It eliminates the need for positioning
- C. It guarantees correct receptor exposure
- D. It reduces patient volume irradiated and scatter production

166. In simulation case 3-166, while orienting a new technologist, while preparing an adult patient, which system standard supports communication of medical images and related information?

- A. AED
- B. DICOM
- C. ALARA
- D. SDS

167. In simulation case 3-167, during a trauma-department case, during a competency review, which projection best demonstrates the calcaneus without superimposition by the talus?

- A. Plantodorsal axial calcaneus
- B. AP ankle
- C. Lateral knee
- D. PA axial skull

168. In simulation case 3-168, while reviewing a repeat image, while preparing an adult patient, which device is appropriate for monitoring cumulative occupational exposure?

- A. A lead anatomical marker
- B. A digital image receptor
- C. A properly assigned personnel dosimeter
- D. A radiographic grid

169. In simulation case 3-169, during a mobile-imaging assignment, while preparing an adult patient, what is the function of a lookup table in digital processing?

- A. Physically rotate the anode
- B. Map stored values to displayed brightness or grayscale
- C. Measure patient blood pressure
- D. Collimate the primary beam

170. In simulation case 3-170, in an outpatient scenario, during a competency review, which projection demonstrates the intercondylar fossa of the knee?

- A. AP knee
- B. Lateral knee
- C. PA axial tunnel projection
- D. Tangential patella

171. In simulation case 3-171, while orienting a new technologist, while preparing an adult patient, what is the principal purpose of added filtration?

- A. Remove low-energy photons from the useful beam
- B. Increase geometric magnification
- C. Create more scatter in the patient
- D. Shorten the source-to-image distance

172. In simulation case 3-172, during a trauma-department case, while preparing an adult patient, which change improves geometric sharpness?

- A. Increase object-to-image distance
- B. Decrease source-to-image distance
- C. Permit voluntary motion
- D. Use a smaller focal spot

173. In simulation case 3-173, while reviewing a repeat image, during a competency review, for a lateral cervical spine, what helps demonstrate C7-T1?

- A. Depress the shoulders while maintaining a true lateral
- B. Elevate both shoulders toward the ears
- C. Rotate the head forty-five degrees
- D. Flex the knees against the receptor

174. In simulation case 3-174, during a mobile-imaging assignment, while preparing an adult patient, which statement correctly describes bremsstrahlung production?

- A. A neutron is absorbed by the detector
- B. An orbital electron emits ultrasound
- C. An electron changes direction near a nucleus and emits energy
- D. A photon splits without nuclear interaction

175. In simulation case 3-175, in an outpatient scenario, while preparing an adult patient, what is the purpose of detector calibration?

- A. Change the patient's anatomy
- B. Replace accurate positioning
- C. Increase scatter production
- D. Correct nonuniform detector response

176. In simulation case 3-176, while orienting a new technologist, during a competency review, which projection demonstrates the sacroiliac joint farthest from the receptor?

- A. Anterior oblique pelvis
- B. Posterior oblique pelvis
- C. Lateral sacrum
- D. AP axial coccyx

177. In simulation case 3-177, during a trauma-department case, at 5 meters, scatter exposure is 100 units. Approximately what percentage remains at 7 meters?

- A. 51 percent
- B. 29 percent
- C. 71 percent
- D. 140 percent

178. In simulation case 3-178, while reviewing a repeat image, during image-quality analysis, which factor most directly controls receptor exposure when other variables remain fixed?

- A. Patient name
- B. Anatomic marker
- C. mAs
- D. Room illumination

179. In simulation case 3-179, during a mobile-imaging assignment, for a repeat examination scenario, for an upright PA chest projection, where is the central ray directed?

- A. Toward the iliac crest at L4
- B. Through the wrist joint
- C. Tangential to the patella
- D. Perpendicular to the receptor at approximately T7

180. In simulation case 3-180, in an outpatient scenario, during image-quality analysis, which interaction is the principal source of occupational scatter during routine radiography?

- A. Pair production in the detector
- B. Coherent emission from the console
- C. Photodisintegration in the collimator
- D. Compton scattering in the patient

181. In simulation case 3-181, while orienting a new technologist, during image-quality analysis, what is the likely image effect of patient motion?

- A. Increased bit depth
- B. Reduced spatial resolution
- C. Improved edge sharpness
- D. Higher detector efficiency

182. In simulation case 3-182, during a trauma-department case, for a repeat examination scenario, why is the PA chest projection preferred over AP when the patient can stand?

- A. It reduces apparent heart magnification
- B. It increases heart magnification
- C. It excludes the lung apices
- D. It requires shallow inspiration

183. In simulation case 3-183, while reviewing a repeat image, during image-quality analysis, what happens to radiation intensity when distance from a point source doubles?

- A. It decreases to one half
- B. It decreases to one fourth
- C. It doubles
- D. It increases fourfold

184. In simulation case 3-184, during a mobile-imaging assignment, during image-quality analysis, increasing OID while other geometry remains constant causes what change?

- A. Less magnification and greater detail
- B. No geometric change
- C. Greater magnification and reduced recorded detail
- D. Elimination of shape distortion

185. In simulation case 3-185, in an outpatient scenario, for a repeat examination scenario, which breathing instruction is used for a routine upright chest exposure?

- A. Suspend after the second full inspiration
- B. Suspend after forceful expiration
- C. Breathe rapidly during exposure
- D. Use quiet breathing without suspension

186. In simulation case 3-186, while orienting a new technologist, for a repeat examination scenario, which projection best demonstrates free intraperitoneal air when the patient cannot stand?

- A. Right lateral decubitus with a vertical beam
- B. Supine abdomen with an angled beam
- C. Left lateral decubitus abdomen with a horizontal beam
- D. Prone abdomen without beam restriction

187. In simulation case 3-187, during a trauma-department case, for a repeat examination scenario, for an AP supine abdomen, the central ray is commonly directed at which landmark?

- A. The jugular notch
- B. The mandibular angle
- C. The radial styloid
- D. The level of the iliac crests

188. In simulation case 3-188, while reviewing a repeat image, for a repeat examination scenario, which position best demonstrates the cervical intervertebral foramina on the side closest to the receptor?

- A. AP axial cervical position
- B. Posterior oblique cervical position
- C. Open-mouth odontoid position
- D. Lateral cervical position

189. In simulation case 3-189, during a mobile-imaging assignment, for a repeat examination scenario, what is the purpose of the open-mouth odontoid projection?

- A. Demonstrate the lumbar zygapophyseal joints
- B. Demonstrate the sternoclavicular joints
- C. Show C1, C2, and the dens through the mouth
- D. Demonstrate the distal tibiofibular joint

190. In simulation case 3-190, in an outpatient scenario, for a repeat examination scenario, which projection demonstrates the lumbar intervertebral foramina?

- A. AP lumbar spine
- B. Oblique lumbar spine
- C. AP axial sacrum
- D. Lateral lumbar spine

191. In simulation case 3-191, while orienting a new technologist, for a repeat examination scenario, what anatomy is highlighted by an oblique lumbar spine projection?

- A. Zygapophyseal joints
- B. Intervertebral foramina
- C. Odontoid process
- D. Sternoclavicular joints

192. In simulation case 3-192, during a trauma-department case, for a repeat examination scenario, for an AP pelvis, why are the lower limbs internally rotated when trauma is not suspected?

- A. To superimpose the greater trochanters completely
- B. To place the femoral necks parallel with the receptor
- C. To increase pelvic rotation
- D. To demonstrate the knees in lateral position

193. In simulation case 3-193, while reviewing a repeat image, for a repeat examination scenario, which projection is commonly used to demonstrate a suspected hip fracture without moving the affected limb?

- A. Frog-leg lateral projection
- B. Weight-bearing AP knee
- C. Tangential patella projection
- D. Axiolateral inferosuperior projection

194. In simulation case 3-194, during a mobile-imaging assignment, for a repeat examination scenario, which projection best demonstrates the scaphoid without foreshortening?

- A. PA wrist with radial deviation
- B. Lateral forearm
- C. PA wrist with ulnar deviation
- D. AP elbow in flexion

195. In simulation case 3-195, in an outpatient scenario, for a repeat examination scenario, which elbow projection demonstrates the radial head with minimal superimposition?

- A. AP oblique with lateral rotation
- B. AP oblique with medial rotation
- C. Acute flexion AP projection
- D. Routine lateral without flexion

196. In simulation case 3-196, while orienting a new technologist, for a repeat examination scenario, for a lateral elbow, what flexion is generally required when the patient's condition permits?

- A. Ten degrees
- B. Ninety degrees
- C. Thirty degrees
- D. One hundred eighty degrees

197. In simulation case 3-197, during a trauma-department case, for a repeat examination scenario, which shoulder projection demonstrates the glenoid cavity in profile?

- A. AP external-rotation shoulder
- B. AP oblique Grashey projection
- C. Inferosuperior axial shoulder
- D. Transthoracic lateral humerus

198. In simulation case 3-198, while reviewing a repeat image, for a repeat examination scenario, which projection can demonstrate shoulder dislocation when abduction is contraindicated?

- A. Inferosuperior axial
- B. AP clavicle
- C. Tangential intertubercular groove
- D. Scapular Y lateral

199. In simulation case 3-199, during a mobile-imaging assignment, for a repeat examination scenario, for an AP knee, where should the central ray be centered?

- A. Approximately one-half inch below the patellar apex
- B. At the greater trochanter
- C. At the medial malleolus
- D. At the anterior superior iliac spine

200. In simulation case 3-200, in an outpatient scenario, for a repeat examination scenario, which projection demonstrates the patellofemoral joint space tangentially?

- A. AP weight-bearing knee
- B. Lateral knee
- C. Sunrise or merchant-type projection
- D. AP oblique knee

Practice Exam 3: Answer Key and Explanations

1. C — mAs is correct. Milliampere-seconds chiefly controls photon quantity and therefore strongly influences receptor exposure when other factors remain unchanged. The distractors describe unrelated geometry, processing, or equipment functions. Evaluate the imaging chain systematically: exposure creation, interaction with the patient, detector response, processing, and display. That sequence helps identify the factor responsible for a quality change.

2. B — Perpendicular to the receptor at approximately T7 is correct. Centering near T7 includes the lungs on an upright PA chest image when positioning and inspiration are adequate. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be

demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that best.

3. D — Use two approved patient identifiers and compare them with the order is correct. Two independent identifiers reduce wrong-patient errors and must agree with the imaging order before exposure. The distractors either bypass verification, weaken infection control, or delay appropriate clinical response. In practice, follow facility policy, communicate clearly, and document objective findings so patient rights and safety remain central.

4. A — Compton scattering in the patient is correct. Compton interactions in tissue redirect photons and make the patient the main source of scatter reaching staff. The alternatives confuse radiation quantities, interactions, or protection methods. Apply ALARA principles, restrict the field, use appropriate exposure factors, and recognize how time, distance, and shielding affect occupational and patient dose before choosing an answer.

5. B — Reduced spatial resolution is correct. Motion spreads recorded detail across detector locations, producing blur and reducing spatial resolution. The distractors describe unrelated geometry, processing, or equipment functions. Evaluate the imaging chain systematically: exposure creation, interaction with the patient, detector response, processing, and display. That sequence helps identify the factor responsible for a quality change.

6. C — It reduces apparent heart magnification is correct. Placing the heart closer to the receptor in PA positioning reduces magnification compared with an AP projection. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that best opens or profiles.

7. D — Implied consent is correct. Voluntary cooperation after an understandable explanation commonly constitutes implied consent for a routine noninvasive examination. The distractors either bypass verification, weaken infection control, or delay appropriate clinical response. In practice, follow facility policy, communicate clearly, and document objective findings so patient rights and safety remain central throughout the examination.

8. A — It decreases to one fourth is correct. The inverse square law states that intensity varies inversely with the square of distance, so doubling distance yields one fourth. The alternatives confuse radiation quantities, interactions, or protection methods. Apply ALARA principles, restrict the field, use appropriate exposure factors, and recognize how time, distance, and shielding affect occupational and patient dose before.

9. C — Greater magnification and reduced recorded detail is correct. Greater object-to-image distance increases magnification and geometric unsharpness unless compensated by increased SID. The distractors describe unrelated geometry, processing, or equipment functions. Evaluate the imaging chain systematically: exposure creation, interaction with the patient, detector response, processing, and display. That sequence helps identify the factor responsible for a quality change.

10. A — Suspend after the second full inspiration is correct. A full inspiration expands the lungs and lowers the diaphragm, improving visualization of pulmonary anatomy. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that best opens or profiles the.

11. D — Use a qualified medical interpreter is correct. A qualified interpreter supports accurate communication, informed participation, privacy, and patient safety without shifting responsibility to relatives. The distractors either bypass verification, weaken infection control, or delay appropriate clinical response. In practice, follow facility policy, communicate clearly, and document objective findings so patient rights and safety remain central throughout the examination.

12. B — 1 mGy per minute is correct. Applying the inverse square law, four divided by two squared equals one mGy per minute. The alternatives confuse radiation quantities, interactions, or protection methods. Apply ALARA principles, restrict the field, use appropriate exposure factors, and recognize how time, distance, and shielding affect occupational and patient dose before choosing an answer.

13. D — Absorb scatter before it reaches the receptor is correct. Grid strips preferentially absorb oblique scatter, improving image contrast but generally requiring increased exposure. The distractors describe unrelated geometry, processing, or equipment functions. Evaluate the imaging chain systematically: exposure creation, interaction with the patient, detector response, processing, and display. That sequence helps identify the factor responsible for a quality change.

14. B — Left lateral decubitus abdomen with a horizontal beam is correct. Left lateral decubitus positioning allows free air to rise beside the liver, where it is easier to recognize. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that.

15. C — Use a gait belt and obtain adequate assistance is correct. A gait belt, sufficient help, and sound body mechanics reduce falls and protect both the patient and staff. The distractors either bypass verification, weaken infection control, or delay appropriate clinical response. In practice, follow facility policy, communicate clearly, and document objective findings so patient rights and safety remain central.

16. A — Radiation-induced cancer is correct. Stochastic effects have no assumed threshold; probability increases with dose, while severity is not dose dependent. The alternatives confuse radiation quantities, interactions, or protection methods. Apply ALARA principles, restrict the field, use appropriate exposure factors, and recognize how time, distance, and shielding affect occupational and patient dose before choosing an answer.

17. D — Detective quantum efficiency is correct. Detective quantum efficiency reflects how efficiently a detector preserves signal relative to noise from incident exposure. The distractors describe unrelated geometry, processing, or equipment functions. Evaluate the imaging chain systematically: exposure creation, interaction with the patient, detector response, processing, and display. That sequence helps identify the factor responsible for a quality change.

18. A — The level of the iliac crests is correct. Centering at the iliac crest level generally includes the abdominal anatomy needed for a supine KUB projection. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that best opens or.

19. B — A documented prior severe contrast reaction is correct. A previous severe reaction materially changes contrast risk and requires protocol review before administration. The distractors either bypass verification, weaken infection control, or delay appropriate clinical response. In practice, follow facility policy, communicate clearly, and document objective findings so patient rights and safety remain central throughout the examination.

20. C — Red bone marrow is correct. Rapidly dividing, less differentiated cells are more radiosensitive, making hematopoietic marrow a major protection concern. The alternatives confuse radiation quantities, interactions, or protection methods. Apply ALARA principles, restrict the field, use appropriate exposure factors, and recognize how time, distance, and shielding affect occupational and patient dose before choosing an answer.

21. A — A greater number of available gray shades is correct. Bit depth determines the number of possible intensity values and therefore the available grayscale range. The distractors describe unrelated geometry, processing, or equipment functions. Evaluate the imaging chain systematically: exposure creation, interaction with the patient, detector response, processing, and display. That sequence helps identify the factor responsible for a quality change.

22. C — Posterior oblique cervical position is correct. Posterior oblique cervical projections demonstrate the foramina nearest the receptor with the prescribed tube angle. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that best opens or profiles the required structure.

23. B — Perform hand hygiene at the indicated moments is correct. Correct hand hygiene removes transient organisms and interrupts a major route of healthcare-associated transmission. The distractors either bypass verification, weaken infection control, or delay appropriate clinical response. In practice, follow facility policy, communicate clearly, and document objective findings so patient rights and safety remain central throughout the examination.

24. D — Gray is correct. The gray measures energy imparted per unit mass, whereas the sievert expresses equivalent or effective dose. The alternatives confuse radiation quantities, interactions, or protection methods. Apply ALARA principles, restrict the field, use appropriate exposure factors, and recognize how time, distance, and shielding affect occupational and patient dose before choosing an answer.

25. D — Place the anatomy over the selected detector chamber is correct. AEC terminates exposure from detector signal, so chamber selection and accurate anatomy alignment are critical. The distractors describe unrelated geometry, processing, or equipment functions. Evaluate the imaging chain systematically: exposure creation, interaction with the patient, detector response, processing, and display. That sequence helps identify the factor responsible for a.

26. B — Show C1, C2, and the dens through the mouth is correct. Proper alignment projects the upper incisors and skull base away from the dens so C1 and C2 are visible. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing.

27. A — An uncapped contaminated needle is correct. Used needles present puncture and bloodborne-pathogen hazards and require immediate disposal in an approved sharps container. The distractors either bypass verification, weaken infection control, or delay appropriate clinical response. In practice, follow facility policy, communicate clearly, and document objective findings so patient rights and safety remain central throughout the examination.

28. C — Stand as far from the patient and tube as practical is correct. Increasing distance substantially reduces exposure under the inverse square relationship and complements time and shielding controls. The alternatives confuse radiation quantities, interactions, or protection methods. Apply ALARA principles, restrict the field, use appropriate exposure factors, and recognize how time, distance, and shielding affect occupational and patient dose.

29. B — Insufficient detected photon signal is correct. Too few detected photons increase statistical fluctuation, producing a noisy appearance called quantum mottle. The distractors describe unrelated geometry, processing, or equipment functions. Evaluate the imaging chain systematically: exposure creation, interaction with the patient, detector response, processing, and display. That sequence helps identify the factor responsible for a quality change.

30. C — Lateral lumbar spine is correct. Lumbar intervertebral foramina are best profiled on a true lateral projection with superimposed posterior vertebral borders. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that best opens or profiles the required structure.

31. A — Assess responsiveness and activate the emergency response process is correct. Initial emergency care begins with rapid assessment and activation of help, followed by appropriate basic life support actions. The distractors either bypass verification, weaken infection control, or delay appropriate clinical response. In practice, follow facility policy, communicate clearly, and document objective findings so patient rights and safety remain central.

32. D — 12 mAs is correct. Multiplying tube current by exposure time gives three hundred times zero point zero four, or twelve mAs. The alternatives confuse radiation quantities, interactions, or protection methods. Apply ALARA principles, restrict the field, use appropriate exposure factors, and recognize how time, distance, and shielding affect occupational and patient dose before choosing an answer.

33. D — DICOM is correct. DICOM standardizes medical image formatting and communication so compatible devices and information systems can exchange data. The distractors describe unrelated geometry, processing, or equipment functions. Evaluate the imaging chain systematically: exposure creation, interaction with the patient, detector response, processing, and display. That sequence helps identify the factor responsible for a quality change.

34. B — Zygapophyseal joints is correct. Oblique lumbar positioning profiles the zygapophyseal joints, producing the familiar Scottie-dog appearance. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that best opens or profiles the required structure.

35. A — Keep sterile objects above waist level and within view is correct. Sterile objects remain controlled only when visible, above waist level, and protected from contact or moisture contamination. The distractors either bypass verification, weaken infection control, or delay appropriate clinical response. In practice, follow facility policy, communicate clearly, and document objective findings so patient rights and safety remain central.

36. C — A properly assigned personnel dosimeter is correct. A personnel dosimeter estimates accumulated occupational dose when worn and processed according to the monitoring program. The alternatives confuse radiation quantities, interactions, or protection methods. Apply ALARA principles, restrict the field, use appropriate exposure factors, and recognize how time, distance, and shielding affect occupational and patient dose before choosing an answer.

37. D — Map stored values to displayed brightness or grayscale is correct. A lookup table maps processed pixel values to display values, shaping the visible grayscale presentation. The distractors describe unrelated geometry, processing, or equipment functions. Evaluate the imaging chain systematically: exposure creation, interaction with the patient, detector response, processing, and display. That sequence helps identify the factor responsible for a.

38. B — To place the femoral necks parallel with the receptor is correct. Internal rotation corrects femoral anteversion, elongates the femoral necks, and places the greater trochanters laterally. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that best opens.

39. A — Stop the injection and assess for extravasation is correct. Pain and swelling suggest extravasation; stopping injection limits tissue injury and permits prompt assessment and documentation. The distractors either bypass verification, weaken infection control, or delay appropriate clinical response. In practice, follow facility policy, communicate clearly, and document objective findings so patient rights and safety remain central throughout the examination.

40. A — Remove low-energy photons from the useful beam is correct. Filtration preferentially removes low-energy photons that would add skin dose without contributing meaningfully to image formation. The alternatives confuse radiation quantities, interactions, or protection methods. Apply ALARA principles, restrict the field, use appropriate exposure factors, and recognize how time, distance, and shielding affect occupational and patient dose before choosing an answer.

41. C — Use a smaller focal spot is correct. A smaller focal spot reduces penumbra and improves recorded detail when other geometric factors remain constant. The distractors describe unrelated geometry, processing, or equipment functions. Evaluate the imaging chain systematically: exposure creation,

interaction with the patient, detector response, processing, and display. That sequence helps identify the factor responsible for a quality change.

42. D — Axiolateral inferosuperior projection is correct. The cross-table axiolateral projection demonstrates the proximal femur while minimizing movement of a potentially fractured hip. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that best opens or profiles the required structure.

43. C — Record objective observations and actions taken is correct. Clinical documentation should be timely, factual, objective, and limited to observed findings, notifications, and care provided. The distractors either bypass verification, weaken infection control, or delay appropriate clinical response. In practice, follow facility policy, communicate clearly, and document objective findings so patient rights and safety remain central throughout the examination.

44. B — An electron changes direction near a nucleus and emits energy is correct. Bremsstrahlung results from deceleration or deflection of projectile electrons in the electric field of target nuclei. The alternatives confuse radiation quantities, interactions, or protection methods. Apply ALARA principles, restrict the field, use appropriate exposure factors, and recognize how time, distance, and shielding affect occupational and patient dose.

45. A — Correct nonuniform detector response is correct. Calibration identifies and compensates for detector response variation, supporting uniform and reliable image appearance. The distractors describe unrelated geometry, processing, or equipment functions. Evaluate the imaging chain systematically: exposure creation, interaction with the patient, detector response, processing, and display. That sequence helps identify the factor responsible for a quality change.

46. D — PA wrist with ulnar deviation is correct. Ulnar deviation elongates the scaphoid and reduces overlap, improving evaluation of a suspected fracture. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that best opens or profiles the required structure.

47. C — Use an airborne-infection isolation room and required respirator is correct. Airborne precautions require engineering controls and appropriate respiratory protection because small particles can remain suspended. The distractors either bypass verification, weaken infection control, or delay appropriate clinical response. In practice, follow facility policy, communicate clearly, and document objective findings so patient rights and safety remain central throughout the examination.

48. B — Use pulsed fluoroscopy and last-image hold when suitable is correct. Pulsed operation and last-image hold reduce beam-on time while preserving needed procedural information. The alternatives confuse radiation quantities, interactions, or protection methods. Apply ALARA principles, restrict the field, use appropriate exposure factors, and recognize how time, distance, and shielding affect occupational and patient dose before choosing an answer.

49. D — mAs is correct. Milliampere-seconds chiefly controls photon quantity and therefore strongly influences receptor exposure when other factors remain unchanged. The distractors describe unrelated geometry, processing, or equipment functions. Evaluate the imaging chain systematically: exposure creation, interaction with the patient, detector response, processing, and display. That sequence helps identify the factor responsible for a quality change.

50. B — AP oblique with lateral rotation is correct. Lateral rotation moves the radius away from the ulna and demonstrates the radial head, neck, and tuberosity. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that best opens or profiles.

51. C — Use two approved patient identifiers and compare them with the order is correct. Two independent identifiers reduce wrong-patient errors and must agree with the imaging order before exposure. The distractors either bypass verification, weaken infection control, or delay appropriate clinical response. In practice, follow facility policy, communicate clearly, and document objective findings so patient rights and safety remain central.

52. A — 32.4 mAs is correct. The exposure maintenance formula multiplies ten by the square of one hundred eighty divided by one hundred, producing thirty-two point four mAs. The alternatives confuse radiation quantities, interactions, or protection methods. Apply ALARA principles, restrict the field, use appropriate exposure factors, and recognize how time, distance, and shielding affect occupational and patient dose before choosing.

53. A — Reduced spatial resolution is correct. Motion spreads recorded detail across detector locations, producing blur and reducing spatial resolution. The distractors describe unrelated geometry, processing, or equipment functions. Evaluate the imaging chain systematically: exposure creation, interaction with the patient, detector response, processing, and display. That sequence helps identify the factor responsible for a quality change.

54. D — Ninety degrees is correct. Flexing the elbow ninety degrees and aligning the epicondyles perpendicular to the receptor produces a true lateral. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that best opens or profiles the required structure.

55. B — Implied consent is correct. Voluntary cooperation after an understandable explanation commonly constitutes implied consent for a routine noninvasive examination. The distractors either bypass verification, weaken infection control, or delay appropriate clinical response. In practice, follow facility policy, communicate clearly, and document objective findings so patient rights and safety remain central throughout the examination.

56. C — It decreases to one fourth is correct. The inverse square law states that intensity varies inversely with the square of distance, so doubling distance yields one fourth. The alternatives confuse radiation quantities, interactions, or protection methods. Apply ALARA principles, restrict the field, use appropriate

exposure factors, and recognize how time, distance, and shielding affect occupational and patient dose before.

57. D — Greater magnification and reduced recorded detail is correct. Greater object-to-image distance increases magnification and geometric unsharpness unless compensated by increased SID. The distractors describe unrelated geometry, processing, or equipment functions. Evaluate the imaging chain systematically: exposure creation, interaction with the patient, detector response, processing, and display. That sequence helps identify the factor responsible for a quality change.

58. B — AP oblique Grashey projection is correct. The Grashey position rotates the patient until the scapular plane is parallel with the receptor, opening the joint space. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that best opens or.

59. C — Use a qualified medical interpreter is correct. A qualified interpreter supports accurate communication, informed participation, privacy, and patient safety without shifting responsibility to relatives. The distractors either bypass verification, weaken infection control, or delay appropriate clinical response. In practice, follow facility policy, communicate clearly, and document objective findings so patient rights and safety remain central throughout the examination.

60. A — Decrease mAs is correct. Milliampere-seconds controls the number of electrons crossing the tube and therefore changes x-ray photon quantity nearly proportionally. The alternatives confuse radiation quantities, interactions, or protection methods. Apply ALARA principles, restrict the field, use appropriate exposure factors, and recognize how time, distance, and shielding affect occupational and patient dose before choosing an answer.

61. B — Absorb scatter before it reaches the receptor is correct. Grid strips preferentially absorb oblique scatter, improving image contrast but generally requiring increased exposure. The distractors describe unrelated geometry, processing, or equipment functions. Evaluate the imaging chain systematically: exposure creation, interaction with the patient, detector response, processing, and display. That sequence helps identify the factor responsible for a quality change.

62. A — Scapular Y lateral is correct. The scapular Y can evaluate humeral-head alignment without requiring the arm abduction used for an axillary projection. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that best opens or profiles the required structure.

63. D — Use a gait belt and obtain adequate assistance is correct. A gait belt, sufficient help, and sound body mechanics reduce falls and protect both the patient and staff. The distractors either bypass verification, weaken infection control, or delay appropriate clinical response. In practice, follow facility policy, communicate clearly, and document objective findings so patient rights and safety remain central.

64. C — Radiation-induced cancer is correct. Stochastic effects have no assumed threshold; probability increases with dose, while severity is not dose dependent. The alternatives confuse radiation quantities, interactions, or protection methods. Apply ALARA principles, restrict the field, use appropriate exposure factors, and recognize how time, distance, and shielding affect occupational and patient dose before choosing an answer.

65. D — Detective quantum efficiency is correct. Detective quantum efficiency reflects how efficiently a detector preserves signal relative to noise from incident exposure. The distractors describe unrelated geometry, processing, or equipment functions. Evaluate the imaging chain systematically: exposure creation, interaction with the patient, detector response, processing, and display. That sequence helps identify the factor responsible for a quality change.

66. A — Approximately one-half inch below the patellar apex is correct. Centering just below the patellar apex places the knee joint near the center of the image receptor. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that best opens.

67. B — A documented prior severe contrast reaction is correct. A previous severe reaction materially changes contrast risk and requires protocol review before administration. The distractors either bypass verification, weaken infection control, or delay appropriate clinical response. In practice, follow facility policy, communicate clearly, and document objective findings so patient rights and safety remain central throughout the examination.

68. C — Red bone marrow is correct. Rapidly dividing, less differentiated cells are more radiosensitive, making hematopoietic marrow a major protection concern. The alternatives confuse radiation quantities, interactions, or protection methods. Apply ALARA principles, restrict the field, use appropriate exposure factors, and recognize how time, distance, and shielding affect occupational and patient dose before choosing an answer.

69. D — A greater number of available gray shades is correct. Bit depth determines the number of possible intensity values and therefore the available grayscale range. The distractors describe unrelated geometry, processing, or equipment functions. Evaluate the imaging chain systematically: exposure creation, interaction with the patient, detector response, processing, and display. That sequence helps identify the factor responsible for a quality change.

70. C — Sunrise or merchant-type projection is correct. A tangential patellar projection profiles the patellofemoral articulation and demonstrates patellar alignment. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that best opens or profiles the required structure.

71. B — Perform hand hygiene at the indicated moments is correct. Correct hand hygiene removes transient organisms and interrupts a major route of healthcare-associated transmission. The distractors either bypass verification, weaken infection control, or delay appropriate clinical response. In practice,

follow facility policy, communicate clearly, and document objective findings so patient rights and safety remain central throughout the examination.

72. A — 10 units is correct. Each half-value layer halves intensity, so eighty becomes forty, twenty, and then ten units after three layers. The alternatives confuse radiation quantities, interactions, or protection methods. Apply ALARA principles, restrict the field, use appropriate exposure factors, and recognize how time, distance, and shielding affect occupational and patient dose before choosing an answer.

73. A — Place the anatomy over the selected detector chamber is correct. AEC terminates exposure from detector signal, so chamber selection and accurate anatomy alignment are critical. The distractors describe unrelated geometry, processing, or equipment functions. Evaluate the imaging chain systematically: exposure creation, interaction with the patient, detector response, processing, and display. That sequence helps identify the factor responsible for a.

74. B — AP oblique with 15–20° medial rotation is correct. Medial rotation places the intermalleolar line parallel to the receptor and opens the ankle mortise. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that best opens or profiles the.

75. D — An uncapped contaminated needle is correct. Used needles present puncture and bloodborne-pathogen hazards and require immediate disposal in an approved sharps container. The distractors either bypass verification, weaken infection control, or delay appropriate clinical response. In practice, follow facility policy, communicate clearly, and document objective findings so patient rights and safety remain central throughout the examination.

76. C — Stand as far from the patient and tube as practical is correct. Increasing distance substantially reduces exposure under the inverse square relationship and complements time and shielding controls. The alternatives confuse radiation quantities, interactions, or protection methods. Apply ALARA principles, restrict the field, use appropriate exposure factors, and recognize how time, distance, and shielding affect occupational and patient dose.

77. B — Insufficient detected photon signal is correct. Too few detected photons increase statistical fluctuation, producing a noisy appearance called quantum mottle. The distractors describe unrelated geometry, processing, or equipment functions. Evaluate the imaging chain systematically: exposure creation, interaction with the patient, detector response, processing, and display. That sequence helps identify the factor responsible for a quality change.

78. A — The affected lateral surface is correct. A mediolateral foot position places the affected side closest to the receptor and reduces object-to-image distance. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that best opens or profiles the required structure.

79. C — Assess responsiveness and activate the emergency response process is correct. Initial emergency care begins with rapid assessment and activation of help, followed by appropriate basic life support actions. The distractors either bypass verification, weaken infection control, or delay appropriate clinical response. In practice, follow facility policy, communicate clearly, and document objective findings so patient rights and safety remain central.

80. D — It reduces patient volume irradiated and scatter production is correct. Restricting the field reduces tissue irradiated, lowers scatter, improves contrast, and supports exposure optimization. The alternatives confuse radiation quantities, interactions, or protection methods. Apply ALARA principles, restrict the field, use appropriate exposure factors, and recognize how time, distance, and shielding affect occupational and patient dose before choosing an answer.

81. B — DICOM is correct. DICOM standardizes medical image formatting and communication so compatible devices and information systems can exchange data. The distractors describe unrelated geometry, processing, or equipment functions. Evaluate the imaging chain systematically: exposure creation, interaction with the patient, detector response, processing, and display. That sequence helps identify the factor responsible for a quality change.

82. D — Plantodorsal axial calcaneus is correct. The axial calcaneus projection angles the beam cephalically to demonstrate the calcaneus and subtalar region. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that best opens or profiles the required structure.

83. A — Keep sterile objects above waist level and within view is correct. Sterile objects remain controlled only when visible, above waist level, and protected from contact or moisture contamination. The distractors either bypass verification, weaken infection control, or delay appropriate clinical response. In practice, follow facility policy, communicate clearly, and document objective findings so patient rights and safety remain central.

84. C — A properly assigned personnel dosimeter is correct. A personnel dosimeter estimates accumulated occupational dose when worn and processed according to the monitoring program. The alternatives confuse radiation quantities, interactions, or protection methods. Apply ALARA principles, restrict the field, use appropriate exposure factors, and recognize how time, distance, and shielding affect occupational and patient dose before choosing an answer.

85. A — Map stored values to displayed brightness or grayscale is correct. A lookup table maps processed pixel values to display values, shaping the visible grayscale presentation. The distractors describe unrelated geometry, processing, or equipment functions. Evaluate the imaging chain systematically: exposure creation, interaction with the patient, detector response, processing, and display. That sequence helps identify the factor responsible for a.

86. B — PA axial tunnel projection is correct. A tunnel projection directs the beam through the flexed knee to profile the intercondylar fossa. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position,

central-ray direction, receptor placement, and breathing instruction that best opens or profiles the required structure.

87. C — Stop the injection and assess for extravasation is correct. Pain and swelling suggest extravasation; stopping injection limits tissue injury and permits prompt assessment and documentation. The distractors either bypass verification, weaken infection control, or delay appropriate clinical response. In practice, follow facility policy, communicate clearly, and document objective findings so patient rights and safety remain central throughout the examination.

88. D — Remove low-energy photons from the useful beam is correct. Filtration preferentially removes low-energy photons that would add skin dose without contributing meaningfully to image formation. The alternatives confuse radiation quantities, interactions, or protection methods. Apply ALARA principles, restrict the field, use appropriate exposure factors, and recognize how time, distance, and shielding affect occupational and patient dose before choosing an answer.

89. A — Use a smaller focal spot is correct. A smaller focal spot reduces penumbra and improves recorded detail when other geometric factors remain constant. The distractors describe unrelated geometry, processing, or equipment functions. Evaluate the imaging chain systematically: exposure creation, interaction with the patient, detector response, processing, and display. That sequence helps identify the factor responsible for a quality change.

90. C — Depress the shoulders while maintaining a true lateral is correct. Shoulder depression reduces superimposition over the lower cervical spine and cervicothoracic junction. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that best opens or profiles the required structure.

91. B — Record objective observations and actions taken is correct. Clinical documentation should be timely, factual, objective, and limited to observed findings, notifications, and care provided. The distractors either bypass verification, weaken infection control, or delay appropriate clinical response. In practice, follow facility policy, communicate clearly, and document objective findings so patient rights and safety remain central throughout the examination.

92. D — 1.25 is correct. Magnification factor equals SID divided by SOD, so one hundred divided by eighty equals one point two five. The alternatives confuse radiation quantities, interactions, or protection methods. Apply ALARA principles, restrict the field, use appropriate exposure factors, and recognize how time, distance, and shielding affect occupational and patient dose before choosing an answer.

93. A — Correct nonuniform detector response is correct. Calibration identifies and compensates for detector response variation, supporting uniform and reliable image appearance. The distractors describe unrelated geometry, processing, or equipment functions. Evaluate the imaging chain systematically: exposure creation, interaction with the patient, detector response, processing, and display. That sequence helps identify the factor responsible for a quality change.

94. C — Posterior oblique pelvis is correct. Posterior oblique positioning opens and demonstrates the sacroiliac joint farthest from the image receptor. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that best opens or profiles the required structure.

95. D — Use an airborne-infection isolation room and required respirator is correct. Airborne precautions require engineering controls and appropriate respiratory protection because small particles can remain suspended. The distractors either bypass verification, weaken infection control, or delay appropriate clinical response. In practice, follow facility policy, communicate clearly, and document objective findings so patient rights and safety remain central throughout the examination.

96. B — Use pulsed fluoroscopy and last-image hold when suitable is correct. Pulsed operation and last-image hold reduce beam-on time while preserving needed procedural information. The alternatives confuse radiation quantities, interactions, or protection methods. Apply ALARA principles, restrict the field, use appropriate exposure factors, and recognize how time, distance, and shielding affect occupational and patient dose before choosing an answer.

97. C — mAs is correct. Milliampere-seconds chiefly controls photon quantity and therefore strongly influences receptor exposure when other factors remain unchanged. The distractors describe unrelated geometry, processing, or equipment functions. Evaluate the imaging chain systematically: exposure creation, interaction with the patient, detector response, processing, and display. That sequence helps identify the factor responsible for a quality change.

98. A — Perpendicular to the receptor at approximately T7 is correct. Centering near T7 includes the lungs on an upright PA chest image when positioning and inspiration are adequate. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that best.

99. B — Use two approved patient identifiers and compare them with the order is correct. Two independent identifiers reduce wrong-patient errors and must agree with the imaging order before exposure. The distractors either bypass verification, weaken infection control, or delay appropriate clinical response. In practice, follow facility policy, communicate clearly, and document objective findings so patient rights and safety remain central.

100. D — Compton scattering in the patient is correct. Compton interactions in tissue redirect photons and make the patient the main source of scatter reaching staff. The alternatives confuse radiation quantities, interactions, or protection methods. Apply ALARA principles, restrict the field, use appropriate exposure factors, and recognize how time, distance, and shielding affect occupational and patient dose before choosing an answer.

101. D — Reduced spatial resolution is correct. Motion spreads recorded detail across detector locations, producing blur and reducing spatial resolution. The distractors describe unrelated geometry, processing, or equipment functions. Evaluate the imaging chain systematically: exposure creation, interaction with

the patient, detector response, processing, and display. That sequence helps identify the factor responsible for a quality change.

102. C — It reduces apparent heart magnification is correct. Placing the heart closer to the receptor in PA positioning reduces magnification compared with an AP projection. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that best opens or profiles.

103. A — Implied consent is correct. Voluntary cooperation after an understandable explanation commonly constitutes implied consent for a routine noninvasive examination. The distractors either bypass verification, weaken infection control, or delay appropriate clinical response. In practice, follow facility policy, communicate clearly, and document objective findings so patient rights and safety remain central throughout the examination.

104. B — It decreases to one fourth is correct. The inverse square law states that intensity varies inversely with the square of distance, so doubling distance yields one fourth. The alternatives confuse radiation quantities, interactions, or protection methods. Apply ALARA principles, restrict the field, use appropriate exposure factors, and recognize how time, distance, and shielding affect occupational and patient dose before.

105. B — Greater magnification and reduced recorded detail is correct. Greater object-to-image distance increases magnification and geometric unsharpness unless compensated by increased SID. The distractors describe unrelated geometry, processing, or equipment functions. Evaluate the imaging chain systematically: exposure creation, interaction with the patient, detector response, processing, and display. That sequence helps identify the factor responsible for a quality change.

106. A — Suspend after the second full inspiration is correct. A full inspiration expands the lungs and lowers the diaphragm, improving visualization of pulmonary anatomy. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that best opens or profiles the.

107. D — Use a qualified medical interpreter is correct. A qualified interpreter supports accurate communication, informed participation, privacy, and patient safety without shifting responsibility to relatives. The distractors either bypass verification, weaken infection control, or delay appropriate clinical response. In practice, follow facility policy, communicate clearly, and document objective findings so patient rights and safety remain central throughout the examination.

108. C — Decrease mAs is correct. Milliampere-seconds controls the number of electrons crossing the tube and therefore changes x-ray photon quantity nearly proportionally. The alternatives confuse radiation quantities, interactions, or protection methods. Apply ALARA principles, restrict the field, use appropriate exposure factors, and recognize how time, distance, and shielding affect occupational and patient dose before choosing an answer.

109. B — Absorb scatter before it reaches the receptor is correct. Grid strips preferentially absorb oblique scatter, improving image contrast but generally requiring increased exposure. The distractors describe unrelated geometry, processing, or equipment functions. Evaluate the imaging chain systematically: exposure creation, interaction with the patient, detector response, processing, and display. That sequence helps identify the factor responsible for a quality change.

110. D — Left lateral decubitus abdomen with a horizontal beam is correct. Left lateral decubitus positioning allows free air to rise beside the liver, where it is easier to recognize. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that.

111. C — Use a gait belt and obtain adequate assistance is correct. A gait belt, sufficient help, and sound body mechanics reduce falls and protect both the patient and staff. The distractors either bypass verification, weaken infection control, or delay appropriate clinical response. In practice, follow facility policy, communicate clearly, and document objective findings so patient rights and safety remain central.

112. A — 16.7 mAs is correct. The grid conversion is ten multiplied by five divided by three, which rounds to sixteen point seven mAs. The alternatives confuse radiation quantities, interactions, or protection methods. Apply ALARA principles, restrict the field, use appropriate exposure factors, and recognize how time, distance, and shielding affect occupational and patient dose before choosing an answer.

113. C — Detective quantum efficiency is correct. Detective quantum efficiency reflects how efficiently a detector preserves signal relative to noise from incident exposure. The distractors describe unrelated geometry, processing, or equipment functions. Evaluate the imaging chain systematically: exposure creation, interaction with the patient, detector response, processing, and display. That sequence helps identify the factor responsible for a quality change.

114. D — The level of the iliac crests is correct. Centering at the iliac crest level generally includes the abdominal anatomy needed for a supine KUB projection. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that best opens or.

115. B — A documented prior severe contrast reaction is correct. A previous severe reaction materially changes contrast risk and requires protocol review before administration. The distractors either bypass verification, weaken infection control, or delay appropriate clinical response. In practice, follow facility policy, communicate clearly, and document objective findings so patient rights and safety remain central throughout the examination.

116. A — Red bone marrow is correct. Rapidly dividing, less differentiated cells are more radiosensitive, making hematopoietic marrow a major protection concern. The alternatives confuse radiation quantities, interactions, or protection methods. Apply ALARA principles, restrict the field, use appropriate exposure factors, and recognize how time, distance, and shielding affect occupational and patient dose before choosing an answer.

117. A — A greater number of available gray shades is correct. Bit depth determines the number of possible intensity values and therefore the available grayscale range. The distractors describe unrelated geometry, processing, or equipment functions. Evaluate the imaging chain systematically: exposure creation, interaction with the patient, detector response, processing, and display. That sequence helps identify the factor responsible for a quality change.

118. C — Posterior oblique cervical position is correct. Posterior oblique cervical projections demonstrate the foramina nearest the receptor with the prescribed tube angle. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that best opens or profiles the required structure.

119. D — Perform hand hygiene at the indicated moments is correct. Correct hand hygiene removes transient organisms and interrupts a major route of healthcare-associated transmission. The distractors either bypass verification, weaken infection control, or delay appropriate clinical response. In practice, follow facility policy, communicate clearly, and document objective findings so patient rights and safety remain central throughout the examination.

120. B — Gray is correct. The gray measures energy imparted per unit mass, whereas the sievert expresses equivalent or effective dose. The alternatives confuse radiation quantities, interactions, or protection methods. Apply ALARA principles, restrict the field, use appropriate exposure factors, and recognize how time, distance, and shielding affect occupational and patient dose before choosing an answer.

121. C — Place the anatomy over the selected detector chamber is correct. AEC terminates exposure from detector signal, so chamber selection and accurate anatomy alignment are critical. The distractors describe unrelated geometry, processing, or equipment functions. Evaluate the imaging chain systematically: exposure creation, interaction with the patient, detector response, processing, and display. That sequence helps identify the factor responsible for a.

122. D — Show C1, C2, and the dens through the mouth is correct. Proper alignment projects the upper incisors and skull base away from the dens so C1 and C2 are visible. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing.

123. A — An uncapped contaminated needle is correct. Used needles present puncture and bloodborne-pathogen hazards and require immediate disposal in an approved sharps container. The distractors either bypass verification, weaken infection control, or delay appropriate clinical response. In practice, follow facility policy, communicate clearly, and document objective findings so patient rights and safety remain central throughout the examination.

124. B — Stand as far from the patient and tube as practical is correct. Increasing distance substantially reduces exposure under the inverse square relationship and complements time and shielding controls. The alternatives confuse radiation quantities, interactions, or protection methods. Apply ALARA principles, restrict the field, use appropriate exposure factors, and recognize how time, distance, and shielding affect occupational and patient dose.

125. B — Insufficient detected photon signal is correct. Too few detected photons increase statistical fluctuation, producing a noisy appearance called quantum mottle. The distractors describe unrelated geometry, processing, or equipment functions. Evaluate the imaging chain systematically: exposure creation, interaction with the patient, detector response, processing, and display. That sequence helps identify the factor responsible for a quality change.

126. A — Lateral lumbar spine is correct. Lumbar intervertebral foramina are best profiled on a true lateral projection with superimposed posterior vertebral borders. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that best opens or profiles the required structure.

127. D — Assess responsiveness and activate the emergency response process is correct. Initial emergency care begins with rapid assessment and activation of help, followed by appropriate basic life support actions. The distractors either bypass verification, weaken infection control, or delay appropriate clinical response. In practice, follow facility policy, communicate clearly, and document objective findings so patient rights and safety remain central.

128. C — It reduces patient volume irradiated and scatter production is correct. Restricting the field reduces tissue irradiated, lowers scatter, improves contrast, and supports exposure optimization. The alternatives confuse radiation quantities, interactions, or protection methods. Apply ALARA principles, restrict the field, use appropriate exposure factors, and recognize how time, distance, and shielding affect occupational and patient dose before choosing an answer.

129. A — DICOM is correct. DICOM standardizes medical image formatting and communication so compatible devices and information systems can exchange data. The distractors describe unrelated geometry, processing, or equipment functions. Evaluate the imaging chain systematically: exposure creation, interaction with the patient, detector response, processing, and display. That sequence helps identify the factor responsible for a quality change.

130. D — Zygapophyseal joints is correct. Oblique lumbar positioning profiles the zygapophyseal joints, producing the familiar Scottie-dog appearance. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that best opens or profiles the required structure.

131. B — Keep sterile objects above waist level and within view is correct. Sterile objects remain controlled only when visible, above waist level, and protected from contact or moisture contamination. The distractors either bypass verification, weaken infection control, or delay appropriate clinical response. In practice, follow facility policy, communicate clearly, and document objective findings so patient rights and safety remain central.

132. C — 1,600 heat units is correct. For single-phase equipment, heat units equal kVp times mA times seconds, producing one thousand six hundred. The alternatives confuse radiation quantities, interactions, or protection methods. Apply ALARA principles, restrict the field, use appropriate exposure factors, and

recognize how time, distance, and shielding affect occupational and patient dose before choosing an answer.

133. A — Map stored values to displayed brightness or grayscale is correct. A lookup table maps processed pixel values to display values, shaping the visible grayscale presentation. The distractors describe unrelated geometry, processing, or equipment functions. Evaluate the imaging chain systematically: exposure creation, interaction with the patient, detector response, processing, and display. That sequence helps identify the factor responsible for a.

134. C — To place the femoral necks parallel with the receptor is correct. Internal rotation corrects femoral anteversion, elongates the femoral necks, and places the greater trochanters laterally. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that best opens.

135. D — Remove low-energy photons from the useful beam is correct. Filtration preferentially removes low-energy photons that would add skin dose without contributing meaningfully to image formation. The alternatives confuse radiation quantities, interactions, or protection methods. Apply ALARA principles, restrict the field, use appropriate exposure factors, and recognize how time, distance, and shielding affect occupational and patient dose before choosing an answer.

136. B — Use a smaller focal spot is correct. A smaller focal spot reduces penumbra and improves recorded detail when other geometric factors remain constant. The distractors describe unrelated geometry, processing, or equipment functions. Evaluate the imaging chain systematically: exposure creation, interaction with the patient, detector response, processing, and display. That sequence helps identify the factor responsible for a quality change.

137. C — Axiolateral inferosuperior projection is correct. The cross-table axiolateral projection demonstrates the proximal femur while minimizing movement of a potentially fractured hip. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that best opens or profiles the required structure.

138. B — An electron changes direction near a nucleus and emits energy is correct. Bremsstrahlung results from deceleration or deflection of projectile electrons in the electric field of target nuclei. The alternatives confuse radiation quantities, interactions, or protection methods. Apply ALARA principles, restrict the field, use appropriate exposure factors, and recognize how time, distance, and shielding affect occupational and patient dose.

139. A — Correct nonuniform detector response is correct. Calibration identifies and compensates for detector response variation, supporting uniform and reliable image appearance. The distractors describe unrelated geometry, processing, or equipment functions. Evaluate the imaging chain systematically: exposure creation, interaction with the patient, detector response, processing, and display. That sequence helps identify the factor responsible for a quality change.

140. D — PA wrist with ulnar deviation is correct. Ulnar deviation elongates the scaphoid and reduces overlap, improving evaluation of a suspected fracture. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that best opens or profiles the required structure.

141. C — Use pulsed fluoroscopy and last-image hold when suitable is correct. Pulsed operation and last-image hold reduce beam-on time while preserving needed procedural information. The alternatives confuse radiation quantities, interactions, or protection methods. Apply ALARA principles, restrict the field, use appropriate exposure factors, and recognize how time, distance, and shielding affect occupational and patient dose before choosing an answer.

142. D — mAs is correct. Milliampere-seconds chiefly controls photon quantity and therefore strongly influences receptor exposure when other factors remain unchanged. The distractors describe unrelated geometry, processing, or equipment functions. Evaluate the imaging chain systematically: exposure creation, interaction with the patient, detector response, processing, and display. That sequence helps identify the factor responsible for a quality change.

143. B — AP oblique with lateral rotation is correct. Lateral rotation moves the radius away from the ulna and demonstrates the radial head, neck, and tuberosity. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that best opens or profiles.

144. A — Compton scattering in the patient is correct. Compton interactions in tissue redirect photons and make the patient the main source of scatter reaching staff. The alternatives confuse radiation quantities, interactions, or protection methods. Apply ALARA principles, restrict the field, use appropriate exposure factors, and recognize how time, distance, and shielding affect occupational and patient dose before choosing an answer.

145. B — Reduced spatial resolution is correct. Motion spreads recorded detail across detector locations, producing blur and reducing spatial resolution. The distractors describe unrelated geometry, processing, or equipment functions. Evaluate the imaging chain systematically: exposure creation, interaction with the patient, detector response, processing, and display. That sequence helps identify the factor responsible for a quality change.

146. D — Ninety degrees is correct. Flexing the elbow ninety degrees and aligning the epicondyles perpendicular to the receptor produces a true lateral. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that best opens or profiles the required structure.

147. A — 10 mAs is correct. Multiplying four hundred mA by zero point zero two five second produces ten mAs. The alternatives confuse radiation quantities, interactions, or protection methods. Apply ALARA principles, restrict the field, use appropriate exposure factors, and recognize how time, distance, and shielding affect occupational and patient dose before choosing an answer.

148. C — Greater magnification and reduced recorded detail is correct. Greater object-to-image distance increases magnification and geometric unsharpness unless compensated by increased SID. The distractors describe unrelated geometry, processing, or equipment functions. Evaluate the imaging chain systematically: exposure creation, interaction with the patient, detector response, processing, and display. That sequence helps identify the factor responsible for a quality change.

149. D — AP oblique Grashey projection is correct. The Grashey position rotates the patient until the scapular plane is parallel with the receptor, opening the joint space. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that best opens or.

150. A — Decrease mAs is correct. Milliampere-seconds controls the number of electrons crossing the tube and therefore changes x-ray photon quantity nearly proportionally. The alternatives confuse radiation quantities, interactions, or protection methods. Apply ALARA principles, restrict the field, use appropriate exposure factors, and recognize how time, distance, and shielding affect occupational and patient dose before choosing an answer.

151. B — Absorb scatter before it reaches the receptor is correct. Grid strips preferentially absorb oblique scatter, improving image contrast but generally requiring increased exposure. The distractors describe unrelated geometry, processing, or equipment functions. Evaluate the imaging chain systematically: exposure creation, interaction with the patient, detector response, processing, and display. That sequence helps identify the factor responsible for a quality change.

152. C — Scapular Y lateral is correct. The scapular Y can evaluate humeral-head alignment without requiring the arm abduction used for an axillary projection. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that best opens or profiles the required structure.

153. B — Radiation-induced cancer is correct. Stochastic effects have no assumed threshold; probability increases with dose, while severity is not dose dependent. The alternatives confuse radiation quantities, interactions, or protection methods. Apply ALARA principles, restrict the field, use appropriate exposure factors, and recognize how time, distance, and shielding affect occupational and patient dose before choosing an answer.

154. C — Detective quantum efficiency is correct. Detective quantum efficiency reflects how efficiently a detector preserves signal relative to noise from incident exposure. The distractors describe unrelated geometry, processing, or equipment functions. Evaluate the imaging chain systematically: exposure creation, interaction with the patient, detector response, processing, and display. That sequence helps identify the factor responsible for a quality change.

155. D — Approximately one-half inch below the patellar apex is correct. Centering just below the patellar apex places the knee joint near the center of the image receptor. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then

select the body position, central-ray direction, receptor placement, and breathing instruction that best opens.

156. A — Red bone marrow is correct. Rapidly dividing, less differentiated cells are more radiosensitive, making hematopoietic marrow a major protection concern. The alternatives confuse radiation quantities, interactions, or protection methods. Apply ALARA principles, restrict the field, use appropriate exposure factors, and recognize how time, distance, and shielding affect occupational and patient dose before choosing an answer.

157. B — A greater number of available gray shades is correct. Bit depth determines the number of possible intensity values and therefore the available grayscale range. The distractors describe unrelated geometry, processing, or equipment functions. Evaluate the imaging chain systematically: exposure creation, interaction with the patient, detector response, processing, and display. That sequence helps identify the factor responsible for a quality change.

158. D — Sunrise or merchant-type projection is correct. A tangential patellar projection profiles the patellofemoral articulation and demonstrates patellar alignment. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that best opens or profiles the required structure.

159. A — Gray is correct. The gray measures energy imparted per unit mass, whereas the sievert expresses equivalent or effective dose. The alternatives confuse radiation quantities, interactions, or protection methods. Apply ALARA principles, restrict the field, use appropriate exposure factors, and recognize how time, distance, and shielding affect occupational and patient dose before choosing an answer.

160. C — Place the anatomy over the selected detector chamber is correct. AEC terminates exposure from detector signal, so chamber selection and accurate anatomy alignment are critical. The distractors describe unrelated geometry, processing, or equipment functions. Evaluate the imaging chain systematically: exposure creation, interaction with the patient, detector response, processing, and display. That sequence helps identify the factor responsible for a.

161. B — AP oblique with 15–20° medial rotation is correct. Medial rotation places the intermalleolar line parallel to the receptor and opens the ankle mortise. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that best opens or profiles the.

162. C — 1 mGy is correct. The inverse square law divides nine by three squared, leaving one mGy at three meters. The alternatives confuse radiation quantities, interactions, or protection methods. Apply ALARA principles, restrict the field, use appropriate exposure factors, and recognize how time, distance, and shielding affect occupational and patient dose before choosing an answer.

163. A — Insufficient detected photon signal is correct. Too few detected photons increase statistical fluctuation, producing a noisy appearance called quantum mottle. The distractors describe unrelated

geometry, processing, or equipment functions. Evaluate the imaging chain systematically: exposure creation, interaction with the patient, detector response, processing, and display. That sequence helps identify the factor responsible for a quality change.

164. D — The affected lateral surface is correct. A mediolateral foot position places the affected side closest to the receptor and reduces object-to-image distance. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that best opens or profiles the required structure.

165. D — It reduces patient volume irradiated and scatter production is correct. Restricting the field reduces tissue irradiated, lowers scatter, improves contrast, and supports exposure optimization. The alternatives confuse radiation quantities, interactions, or protection methods. Apply ALARA principles, restrict the field, use appropriate exposure factors, and recognize how time, distance, and shielding affect occupational and patient dose before choosing an answer.

166. B — DICOM is correct. DICOM standardizes medical image formatting and communication so compatible devices and information systems can exchange data. The distractors describe unrelated geometry, processing, or equipment functions. Evaluate the imaging chain systematically: exposure creation, interaction with the patient, detector response, processing, and display. That sequence helps identify the factor responsible for a quality change.

167. A — Plantodorsal axial calcaneus is correct. The axial calcaneus projection angles the beam cephalically to demonstrate the calcaneus and subtalar region. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that best opens or profiles the required structure.

168. C — A properly assigned personnel dosimeter is correct. A personnel dosimeter estimates accumulated occupational dose when worn and processed according to the monitoring program. The alternatives confuse radiation quantities, interactions, or protection methods. Apply ALARA principles, restrict the field, use appropriate exposure factors, and recognize how time, distance, and shielding affect occupational and patient dose before choosing an answer.

169. B — Map stored values to displayed brightness or grayscale is correct. A lookup table maps processed pixel values to display values, shaping the visible grayscale presentation. The distractors describe unrelated geometry, processing, or equipment functions. Evaluate the imaging chain systematically: exposure creation, interaction with the patient, detector response, processing, and display. That sequence helps identify the factor responsible for a.

170. C — PA axial tunnel projection is correct. A tunnel projection directs the beam through the flexed knee to profile the intercondylar fossa. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that best opens or profiles the required structure.

171. A — Remove low-energy photons from the useful beam is correct. Filtration preferentially removes low-energy photons that would add skin dose without contributing meaningfully to image formation. The alternatives confuse radiation quantities, interactions, or protection methods. Apply ALARA principles, restrict the field, use appropriate exposure factors, and recognize how time, distance, and shielding affect occupational and patient dose before choosing an answer.

172. D — Use a smaller focal spot is correct. A smaller focal spot reduces penumbra and improves recorded detail when other geometric factors remain constant. The distractors describe unrelated geometry, processing, or equipment functions. Evaluate the imaging chain systematically: exposure creation, interaction with the patient, detector response, processing, and display. That sequence helps identify the factor responsible for a quality change.

173. A — Depress the shoulders while maintaining a true lateral is correct. Shoulder depression reduces superimposition over the lower cervical spine and cervicothoracic junction. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that best opens or profiles the required structure.

174. C — An electron changes direction near a nucleus and emits energy is correct. Bremsstrahlung results from deceleration or deflection of projectile electrons in the electric field of target nuclei. The alternatives confuse radiation quantities, interactions, or protection methods. Apply ALARA principles, restrict the field, use appropriate exposure factors, and recognize how time, distance, and shielding affect occupational and patient dose.

175. D — Correct nonuniform detector response is correct. Calibration identifies and compensates for detector response variation, supporting uniform and reliable image appearance. The distractors describe unrelated geometry, processing, or equipment functions. Evaluate the imaging chain systematically: exposure creation, interaction with the patient, detector response, processing, and display. That sequence helps identify the factor responsible for a quality change.

176. B — Posterior oblique pelvis is correct. Posterior oblique positioning opens and demonstrates the sacroiliac joint farthest from the image receptor. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that best opens or profiles the required structure.

177. A — 51 percent is correct. The inverse square relationship gives one hundred times five squared divided by seven squared, approximately fifty-one percent. The alternatives confuse radiation quantities, interactions, or protection methods. Apply ALARA principles, restrict the field, use appropriate exposure factors, and recognize how time, distance, and shielding affect occupational and patient dose before choosing an answer.

178. C — mAs is correct. Milliampere-seconds chiefly controls photon quantity and therefore strongly influences receptor exposure when other factors remain unchanged. The distractors describe unrelated geometry, processing, or equipment functions. Evaluate the imaging chain systematically: exposure

creation, interaction with the patient, detector response, processing, and display. That sequence helps identify the factor responsible for a quality change.

179. D — Perpendicular to the receptor at approximately T7 is correct. Centering near T7 includes the lungs on an upright PA chest image when positioning and inspiration are adequate. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that best.

180. D — Compton scattering in the patient is correct. Compton interactions in tissue redirect photons and make the patient the main source of scatter reaching staff. The alternatives confuse radiation quantities, interactions, or protection methods. Apply ALARA principles, restrict the field, use appropriate exposure factors, and recognize how time, distance, and shielding affect occupational and patient dose before choosing an answer.

181. B — Reduced spatial resolution is correct. Motion spreads recorded detail across detector locations, producing blur and reducing spatial resolution. The distractors describe unrelated geometry, processing, or equipment functions. Evaluate the imaging chain systematically: exposure creation, interaction with the patient, detector response, processing, and display. That sequence helps identify the factor responsible for a quality change.

182. A — It reduces apparent heart magnification is correct. Placing the heart closer to the receptor in PA positioning reduces magnification compared with an AP projection. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that best opens or profiles.

183. B — It decreases to one fourth is correct. The inverse square law states that intensity varies inversely with the square of distance, so doubling distance yields one fourth. The alternatives confuse radiation quantities, interactions, or protection methods. Apply ALARA principles, restrict the field, use appropriate exposure factors, and recognize how time, distance, and shielding affect occupational and patient dose before.

184. C — Greater magnification and reduced recorded detail is correct. Greater object-to-image distance increases magnification and geometric unsharpness unless compensated by increased SID. The distractors describe unrelated geometry, processing, or equipment functions. Evaluate the imaging chain systematically: exposure creation, interaction with the patient, detector response, processing, and display. That sequence helps identify the factor responsible for a quality change.

185. A — Suspend after the second full inspiration is correct. A full inspiration expands the lungs and lowers the diaphragm, improving visualization of pulmonary anatomy. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that best opens or profiles the.

186. C — Left lateral decubitus abdomen with a horizontal beam is correct. Left lateral decubitus positioning allows free air to rise beside the liver, where it is easier to recognize. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that.

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188. B — Posterior oblique cervical position is correct. Posterior oblique cervical projections demonstrate the foramina nearest the receptor with the prescribed tube angle. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that best opens or profiles the required structure.

189. C — Show C1, C2, and the dens through the mouth is correct. Proper alignment projects the upper incisors and skull base away from the dens so C1 and C2 are visible. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing.

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191. A — Zygapophyseal joints is correct. Oblique lumbar positioning profiles the zygapophyseal joints, producing the familiar Scottie-dog appearance. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that best opens or profiles the required structure.

192. B — To place the femoral necks parallel with the receptor is correct. Internal rotation corrects femoral anteversion, elongates the femoral necks, and places the greater trochanters laterally. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that best opens.

193. D — Axiolateral inferosuperior projection is correct. The cross-table axiolateral projection demonstrates the proximal femur while minimizing movement of a potentially fractured hip. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that best opens or profiles the required structure.

194. C — PA wrist with ulnar deviation is correct. Ulnar deviation elongates the scaphoid and reduces overlap, improving evaluation of a suspected fracture. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that best opens or profiles the required structure.

195. A — AP oblique with lateral rotation is correct. Lateral rotation moves the radius away from the ulna and demonstrates the radial head, neck, and tuberosity. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that best opens or profiles.

196. B — Ninety degrees is correct. Flexing the elbow ninety degrees and aligning the epicondyles perpendicular to the receptor produces a true lateral. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that best opens or profiles the required structure.

197. B — AP oblique Grashey projection is correct. The Grashey position rotates the patient until the scapular plane is parallel with the receptor, opening the joint space. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that best opens or.

198. D — Scapular Y lateral is correct. The scapular Y can evaluate humeral-head alignment without requiring the arm abduction used for an axillary projection. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that best opens or profiles the required structure.

199. A — Approximately one-half inch below the patellar apex is correct. Centering just below the patellar apex places the knee joint near the center of the image receptor. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that best opens.

200. C — Sunrise or merchant-type projection is correct. A tangential patellar projection profiles the patellofemoral articulation and demonstrates patellar alignment. The other options describe different projections, landmarks, or positioning goals. First identify the anatomy that must be demonstrated, then select the body position, central-ray direction, receptor placement, and breathing instruction that best opens or profiles the required structure.