

Chapter 01: Terminology, Positioning, and Imaging Principles
Lampignano: Bontrager's Textbook of Radiographic Positioning and Related Anatomy, 10th Edition

MULTIPLE CHOICE

1. The lowest level of structural organization in the human body is the _____ level.
- a. molecular
 - b. cellular
 - c. chemical
 - d. atomic

ANS: C REF: 3

2. What type of tissue binds together and supports the various structures of the body?
- a. Epithelial
 - b. Connective
 - c. Muscular
 - d. Nervous

ANS: B REF: 3

3. What type of tissue covers internal and external surfaces of the body?
- a. Muscular
 - b. Connective
 - c. Nervous
 - d. Epithelial

ANS: D REF: 3

4. How many individual body systems comprise the human body?
- a. 22
 - b. 13
 - c. 10
 - d. 8

ANS: C REF: 3

5. How many separate bones are found in the adult human body?
- a. 181
 - b. 215
 - c. 206
 - d. 236

ANS: C REF: 4

6. Which system of the human body is responsible for the elimination of solid waste?
- a. Circulatory
 - b. Respiratory
 - c. Urinary
 - d. Digestive



ANS: D REF: 4

7. Which of the following systems of the human body includes all ductless glands of the body?
- Endocrine
 - Integumentary
 - Muscular
 - Glandular

ANS: A REF: 6

8. Which of the following body systems helps to regulate body temperature?
- Circulatory
 - Urinary
 - Endocrine
 - Nervous

ANS: A REF: 7

9. Which of the following bones is part of the axial skeleton?
- Radius
 - Hip bone
 - Clavicle
 - Sternum

ANS: D REF: 7

10. How many bones are there in the adult axial skeleton?
- 206
 - 80
 - 54
 - 126

ANS: B REF: 7

11. What is the name of the small oval-shaped bone found in tendons?
- Wormian
 - Tendinous
 - Irregular
 - Sesamoid

ANS: D REF: 8

12. Which of the following bones is classified as a long bone?
- Carpal bone
 - Scapula
 - Cranium
 - Humerus

ANS: D REF: 8

13. What is the name of the dense fibrous membrane that covers bone?
- Cancellous portion



- b. Periosteum
- c. Diploë
- d. Medullary portion

ANS: B REF: 10

14. Which of the following bones is classified as a short bone?

- a. Vertebrae
- b. Phalanges (toes)
- c. Scapulae
- d. Carpal (wrist bones)

ANS: D REF: 10

15. Which of the following is a secondary growth center for endochondral ossification?

- a. Diaphysis
- b. Epiphyses
- c. Metaphysis
- d. Articular cartilage

ANS: B REF: 10

16. Which aspect of the long bones is responsible for the production of red blood cells?

- a. Compact bone
- b. Periosteum
- c. Medullary cavity
- d. Spongy or cancellous bone

ANS: D REF: 10

17. Examples of “flat” bones are the:

- a. calvaria, ribs, scapulae, and sternum.
- b. ribs, sternum, patella, and ilia of pelvis.
- c. sternum, scapulae, ilia of pelvis, and base of cranium.
- d. sternum and ilia of pelvis only.

ANS: A REF: 10

18. What is the primary center for bone growth termed?

- a. Epiphyses
- b. Diaphysis
- c. Metaphysis
- d. Epiphyseal plate

ANS: B REF: 10

19. Which of the following is NOT a functional classification of joints?

- a. Synarthrosis
- b. Amphiarthrosis
- c. Cartilaginous
- d. Diarthrosis

ANS: C REF: 11



20. The structural term for a freely movable joint is:
- a. fibrous.
 - b. cartilaginous.
 - c. synovial.
 - d. gomphosis.

ANS: C REF: 11

21. Which of the following joints displays flexion and extension type of movement primarily?
- a. Pivot
 - b. Ellipsoidal
 - c. Saddle
 - d. Ginglymus

ANS: D REF: 13

22. Which of the following joints is NOT a synovial joint?
- a. Skull suture
 - b. Elbow joint
 - c. Hip joint
 - d. Proximal radioulnar joint

ANS: A REF: 12 |14

23. Which of the following is classified as a saddle (sellar) joint?
- a. Ankle joint
 - b. Temporomandibular joint
 - c. Knee joint
 - d. Intercarpal joint

ANS: A REF: 13

24. Which of the following is classified as a bicondylar joint?
- a. Shoulder joint
 - b. Temporomandibular joint
 - c. First and second cervical vertebra joint
 - d. Distal radioulnar joint

ANS: B REF: 14

25. An upright position with the arms abducted, palms forward, and head forward describes the _____ position.
- a. anteroposterior (AP)
 - b. decubitus
 - c. anatomic
 - d. oblique

ANS: C REF: 10

26. A representation of the patient's anatomic structures that can be obtained, viewed, manipulated, and stored digitally is the definition for:
- a. radiographic film.



- b. radiography.
- c. radiographic image.
- d. radiographic examination.

ANS: C REF: 16

27. The vertical plane that divides the body into equal right and left halves describes the _____ plane.
- a. coronal
 - b. median or midsagittal
 - c. longitudinal
 - d. horizontal

ANS: B REF: 17

28. A longitudinal plane that divides the body into equal anterior and posterior parts is the _____ plane.
- a. midcoronal
 - b. midsagittal
 - c. horizontal
 - d. oblique

ANS: A REF: 17

29. Which of the following terms describes the sole of the foot?
- a. Palmar
 - b. Dorsum
 - c. Volar
 - d. Plantar

ANS: D REF: 18

30. Which term describes the back or posterior aspect of the hand?
- a. Dorsum pedis
 - b. Dorsum manus
 - c. Palmar
 - d. Volar

ANS: B REF: 18

31. A position in which the head is lower than the feet is:
- a. Trendelenburg.
 - b. lithotomy.
 - c. Fowler.
 - d. recumbent.

ANS: A REF: 20

32. Which term describes lying down in any position?
- a. Horizontal
 - b. Fowler
 - c. Recumbent
 - d. Anatomic



ANS: C REF: 20

33. A recumbent oblique position in which the patient is lying on the left anterior surface with it rotated toward the image receptor is termed:
- right posterior oblique.
 - left posterior oblique.
 - Sims' position.
 - Fowler position.

ANS: C REF: 21

34. A patient is lying on her back facing the x-ray tube. The right side of her body is turned 20° toward the image receptor. What is this radiographic position?
- LPO (left posterior oblique)
 - RPO (right posterior oblique)
 - RAO (right anterior oblique)
 - LAO (left anterior oblique)

ANS: B REF: 21

35. A patient is erect with the left side directly against the image receptor. The central ray (CR) enters the right side of the body. What is this radiographic position?
- Right lateral
 - Left lateral decubitus
 - Left lateral
 - Dorsal decubitus

ANS: C REF: 21

36. A patient is lying on her back. The x-ray tube is horizontally directed with the CR entering the right side of the body. The image receptor is adjacent to the left side of the body. What is the radiographic position?
- Left lateral decubitus
 - Left lateral
 - Right lateral decubitus
 - Dorsal decubitus

ANS: D REF: 22

37. A patient is erect facing the image receptor. The left side of the body is turned 45° toward the image receptor. The CR enters the posterior aspect of the body and exits the anterior. What is this radiographic position?
- LAO
 - LPO
 - Left lateral
 - Posteroanterior (PA)

ANS: A REF: 21

38. What type of projection is created with the CR directed along or parallel to the long axis of a structure or anatomic part?
- Axial



- b. Tangential
- c. Lordotic
- d. Transthoracic

ANS: A REF: 23

39. A projection in which the CR skims a body part to project it in profile is termed:
- a. tangential.
 - b. lordotic.
 - c. axial.
 - d. decubitus.

ANS: A REF: 23

40. What is the general term for a position in which the long axis of the body is angled in relationship to the image receptor rather than the central ray (e.g., special chest projection)?
- a. Axial
 - b. Trendelenburg
 - c. Decubitus
 - d. Lordotic

ANS: D REF: 23

41. The opposite term for supination is:
- a. protraction.
 - b. adduction.
 - c. pronation.
 - d. retraction.

ANS: C REF: 28

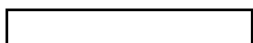
42. Which of the following positions is often used to insert a rectal enema tip before a barium enema study?
- a. Fowler
 - b. Modified Sims'
 - c. Lithotomy
 - d. Trendelenburg

ANS: B REF: 20

43. A dorsoplantar projection would be a radiographic study of:
- a. any anatomic region.
 - b. the hand.
 - c. the foot.
 - d. the skull.

ANS: C REF: 24

44. Moving the foot and toes downward is:
- a. eversion.
 - b. inversion.
 - c. dorsiflexion.
 - d. plantar flexion.



ANS: D REF: 27

45. Movement in the form of a circle is the definition for:
- rotation.
 - retraction.
 - circumduction.
 - protraction.

ANS: C REF: 210

46. Which of the following terms is the opposite of ipsilateral?
- Medial
 - Deviation
 - Contralateral
 - Axiolateral

ANS: C REF: 25

47. The radiographic term *projection* is defined as:
- general position of the patient.
 - path or direction of the central ray.
 - radiographic image as seen from the vantage of the image receptor.
 - computer-assisted image.

ANS: B REF: 30

48. Which of following is NOT one of the evaluation criteria applied in the evaluation of images?
- Patient condition
 - Anatomy demonstrated
 - Collimation and CR
 - Exposure criteria

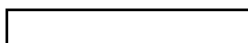
ANS: A REF: 31

49. A patient enters the emergency department (ED) with a piece of wire in the palm of the hand. What is the minimum number of projections required to be taken for this radiographic study?
- One
 - Two
 - Three
 - Four or more

ANS: B REF: 34

50. Which of the following radiographic procedures often only requires a single AP projection be taken?
- Finger
 - Ribs
 - Chest
 - Pelvis

ANS: D REF: 35



51. What is the final step taken before making the exposure during a positioning routine?
- Image receptor centering
 - Placing anatomic markers on image receptor
 - Ensuring correct gonadal shield placement
 - Collimation adjustments

ANS: C REF: 34

52. What is the minimal number of projections taken for a study of the femur?
- One
 - Two
 - Three
 - Four

ANS: B REF: 35

53. What is the minimal number of projections taken for a study of the right hip?
- One
 - Two
 - Three
 - Four

ANS: B REF: 35

54. What is the minimal number of projections taken for a postreduction (to realign a fracture) study of the ankle?
- One
 - Two
 - Three
 - Four

ANS: B REF: 35

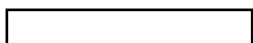
55. What is the minimal number of projections taken for a study of the elbow?
- One
 - Two
 - Three
 - Four

ANS: C REF: 35

56. A patient is erect with the left side of his chest placed against the image receptor. The central ray enters the right side of the upper chest and exits the left. Which specific position has been performed?
- Dorsal decubitus
 - Transthoracic lateral
 - Right lateral
 - Ventral decubitus

ANS: B REF: 24

57. A patient is erect facing the x-ray tube and leaning the shoulders backward 20° to 30° toward the IR. The central ray is perpendicular to the IR. What specific position has been performed?



- a. Lordotic
- b. Oblique
- c. Kyphotic
- d. Tangential

ANS: A REF: 23

58. The top of the foot is placed against the image receptor with the perpendicular central ray entering the sole of the foot. What specific projection has been performed?
- a. Transpedal
 - b. Plantodorsal
 - c. Axial dorsoplantar
 - d. Tangential plantodorsal

ANS: B REF: 24

59. The patient is lying on her right side on a cart. The anterior surface of the patient is against the image receptor. A horizontal central ray enters the posterior surface and exits the anterior surface of the body. What specific projection/position has been performed?
- a. AP
 - b. PA
 - c. Right lateral decubitus
 - d. Left lateral decubitus

ANS: C REF: 22

60. The patient's head and neck are hyperextended with the top of the skull directly against the image receptor. The central ray enters just below the chin. Which specific projection has been performed?
- a. Submentovertical
 - b. Acanthioparietal
 - c. Parietoacanthial
 - d. Verticosubmental

ANS: A REF: 24

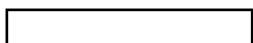
61. Which of the following is NOT one of the four image quality factors of an analog radiograph?
- a. Contrast
 - b. Spatial resolution
 - c. Source image receptor distance (SID)
 - d. Distortion

ANS: C REF: 310

62. The amount of blackness seen on a processed radiograph is called:
- a. fog.
 - b. scatter.
 - c. contrast.
 - d. density.

ANS: D REF: 310

63. Which of the following factors primarily controls radiographic density in the analog image?



- a. kV
- b. mAs
- c. Film-screen speed
- d. Optimal immunomodulating dose (OID)

ANS: B REF: 310-40

64. A radiograph of the hand is underexposed and nondiagnostic. The following analog (film-screen) exposure factors were used: 50 kV, 2 mAs, 40-inch (102 cm) SID. Which of the following sets of exposure factors should be used during the repeat exposure?
- a. 50 kV, 8 mAs, 40 inches (102 cm)
 - b. 50 kV, 1 mAs, 40 inches (102 cm)
 - c. 60 kV, 4 mAs, 40 inches (102 cm)
 - d. 50 kV, 4 mAs, 40 inches (102 cm)

ANS: D REF: 310

65. A ____% increase in kV will increase density the same as doubling the mAs (analog imaging).
- a. 15
 - b. 10
 - c. 100
 - d. 25

ANS: A REF: 42

66. Exposure time is usually expressed in units of:
- a. seconds.
 - b. nanoseconds.
 - c. microseconds.
 - d. milliseconds.

ANS: D REF: 310

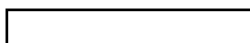
67. What is the primary controlling factor for radiographic contrast in analog imaging?
- a. kV
 - b. mA
 - c. Film-screen speed
 - d. SID

ANS: A REF: 42

68. Which of the following radiographic studies would best benefit by applying the anode heel effect?
- a. Hand
 - b. Skull
 - c. Thoracic spine
 - d. Ribs

ANS: C REF: 40

69. Which of the following devices can be used rather than applying the anode heel effect to compensate for anatomic part thickness differences?



- a. Compensating filters
- b. Copper filters
- c. Graded screens
- d. Added filtration

ANS: A REF: 41

70. Short scale contrast (in the analog image) is the result of:
- a. scatter radiation.
 - b. collimation.
 - c. high kV.
 - d. low kV.

ANS: D REF: 42

71. What is the most effective method to reduce the production of scatter radiation?
- a. Increase kV.
 - b. Increase mAs.
 - c. Collimate.
 - d. Use a grid.

ANS: C REF: 42

72. A radiograph of the abdomen is underexposed and must be repeated. The original **analog** exposure factors used were 65 kV with 25 mAs. The technologist decides to keep the mA at the same level but change the kV to increase radiographic density. How much of an increase is needed in kV to double the density?
- a. 3 to 5 kV
 - b. 10 to 10 kV
 - c. 10 to 15 kV
 - d. 15 to 20 kV

ANS: B REF: 310

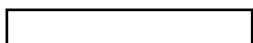
73. What type of radiographic contrast is produced with a high (120) kV technique?
- a. Low contrast, short scale
 - b. High contrast, short scale
 - c. Low contrast, long scale
 - d. High contrast, long scale

ANS: C REF: 42

74. Which of the following controlling factors will most affect radiographic resolution?
- a. kV
 - b. mAs
 - c. Filtration
 - d. Focal spot size

ANS: D REF: 44

75. The unsharp edge of the projected image is termed:
- a. distortion.
 - b. penumbra.



- c. edge loss.
- d. margin distortion.

ANS: B REF: 44

76. A radiograph of the abdomen demonstrates involuntary motion caused by bowel peristalsis (involuntary contractions). Which of the following factors will best eliminate this problem during the repeat exposure?
- a. Decrease SID.
 - b. Turn patient into prone position rather than supine.
 - c. Use higher kV.
 - d. Decrease exposure time.

ANS: D REF: 45

77. Which of the following changes will improve spatial resolution?
- a. Decrease SID.
 - b. Decrease OID.
 - c. Decrease kV.
 - d. None of the above will improve spatial resolution.

ANS: B REF: 44

78. Increasing the SID to 48 inches (123 cm) from 40 inches (102 cm) and adjusting the mAs accordingly will:
- a. increase penumbra.
 - b. along with the use of a small focal spot, decrease penumbra.
 - c. decrease patient skin dose but increase internal dose because of an increase in scatter radiation.
 - d. have no effect on image sharpness or on patient dose.

ANS: B REF: 46-47

79. Each digital image is two dimensional and is formed by a matrix of:
- a. bytes.
 - b. algorithms.
 - c. voxels.
 - d. pixels.

ANS: D REF: 410-50

80. Highly complex mathematical formulas applied during digital processing of the image are termed:
- a. pixels.
 - b. algorithms.
 - c. digital filters.
 - d. matrices.

ANS: B REF: 410

81. The intensity of light that represents the individual pixels in the digital image on the monitor is the definition for:
- a. contrast.

- b. spatial resolution.
- c. brightness.
- d. noise.

ANS: C REF: 50

82. Which of the following factors has the greatest effect on the brightness of the digital image?
- a. kV
 - b. mAs
 - c. Processing software
 - d. Matrix size

ANS: C REF: 50

83. The ability of a digital imaging system to distinguish between similar tissues is the definition for:
- a. edge enhancement.
 - b. contrast resolution.
 - c. sensitivity.
 - d. system response.

ANS: B REF: 50

84. Contrast in the digital image is primarily affected by:
- a. kV.
 - b. mAs.
 - c. matrix size.
 - d. predetermined algorithms.

ANS: D REF: 50

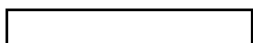
85. The greater the bit depth of a digital system, the greater the:
- a. brightness.
 - b. resolution.
 - c. exposure index.
 - d. contrast resolution.

ANS: D REF: 50

86. Which of the following factors has the greatest effect on spatial resolution of the digital image?
- a. Acquisition pixel size
 - b. Display pixel size
 - c. Use of a grid
 - d. SID

ANS: A REF: 51

87. Misrepresentation of object size or shape as projected onto radiographic recording media is the general definition for:
- a. penumbra.
 - b. distortion.
 - c. magnification.



d. margin loss.

ANS: B REF: 51

88. The number of x-ray photons that strike the digital receptor can be considered as:

- a. noise.
- b. kV.
- c. signal.
- d. density.

ANS: C REF: 52

89. A numerical value that is representative of the exposure projected on the digital image receptor is termed:

- a. algorithm.
- b. variance.
- c. signal-to-noise ratio (SNR).
- d. exposure indicator.

ANS: D REF: 51

90. A random disturbance that obscures or reduces clarity is termed:

- a. signal.
- b. noise.
- c. electrical fluctuation.
- d. variance.

ANS: B REF: 52

91. The intensity of light that represents the individual pixels in the image on the monitor defines:

- a. density.
- b. brightness.
- c. contrast.
- d. spatial resolution.

ANS: B REF: 50

92. Which of the following factors has the greatest negative impact on SNR?

- a. Excessive kV
- b. Collimation
- c. Insufficient mAs
- d. Long SID

ANS: C REF: 52

93. Which device or technique is most effective in controlling scatter radiation in digital imaging?

- a. Focal spot size
- b. Added filtration
- c. Postprocessing algorithm
- d. Grid

ANS: D REF: 52

