

RS Registry Review 3 Summer 2026

Multiple Choice

Identify the choice that best completes the statement or answers the question.

- _____ 1. The x-ray absorber typically used in direct capture DR is a:
- photodiode.
 - phototransistor.
 - photoconductor.
 - photoelectron.
- _____ 2. A look-up table maps:
- latent images.
 - subject contrasts.
 - image gray scale values.
 - optical density.
- _____ 3. Preset image annotation controls include all of the following except:
- arrows.
 - position indicators.
 - date and time stamps.
 - image acquisition markers.
- _____ 4. Multiple numeric values divided into an array of small elements capable of being processed is the definition of _____ images.
- analog
 - digital
 - medical
 - radiographic
- _____ 5. Which of the following statements is not true?
- Matrix size can change without affecting the FOV.
 - FOV can change without affecting the matrix.
 - Changing the matrix or the FOV will change the size of the pixel.
 - Changing the matrix and the FOV will not change the size of the pixel.
- _____ 6. Each square in a matrix is called a:
- matrix element.
 - picture element.
 - bit.
 - byte.
- _____ 7. The number of bits per pixel is known as bit:
- pitch.
 - depth.
 - height.
 - width.

- ___ 8. The size of the pixel is determined by the:
- bit.
 - bit depth.
 - matrix.
 - byte.
- ___ 9. Which of the following statements is not true?
- Exposure index* refers to the amount of exposure to the patient.
 - Exposure index* refers to the amount of exposure to the image receptor.
 - Exposure is not uniformly represented across manufacturers.
 - Exposure index standardization is beneficial to the technologist.
- ___ 10. The ability of a digital system to display subtle changes in shades of gray is called:
- image quality.
 - contrast resolution.
 - spatial resolution.
 - dynamic range.
- ___ 11. The ability of an imaging system to demonstrate small details of an object is known as:
- image quality.
 - contrast resolution.
 - spatial resolution.
 - dynamic range.
- ___ 12. A system's ability to respond to varying levels of exposure, resulting in more detail, is referred to as:
- spatial resolution.
 - dynamic range.
 - contrast resolution.
 - dynamic resolution.
- ___ 13. The efficiency of a system to convert x-ray input signal into a useful output image is known as:
- dynamic range.
 - spatial resolution.
 - latitude.
 - detective quantum efficiency.
- ___ 14. Failure of the reader to find the collimation edges of an image:
- will result in image cutoff.
 - may cause the image to be too bright or too dark.
 - will eliminate all scatter.
 - will have no effect on the resultant image.
- ___ 15. Data collected within the collimator are represented by a:
- histogram.
 - characteristic curve.
 - pixel graph.
 - matrix graph.
- ___ 16. A histogram displays the useful signal by locating:

- a. all pixel values.
 - b. maximum and minimum signal.
 - c. maximum signal only.
 - d. minimum signal only.
- ___ 17. The higher the kilovoltage peak, the:
- a. wider the histogram.
 - b. narrower the histogram.
 - c. higher the frequency.
 - d. lower the frequency.
- ___ 18. If too few pixels are sampled, the result will be:
- a. high resolution.
 - b. low resolution.
 - c. high contrast.
 - d. low contrast.
- ___ 19. Raw data used to form the image histogram are compared with:
- a. a normal histogram referenced by the computer.
 - b. all histograms stored for that anatomic part.
 - c. the last histogram of that anatomic part.
 - d. none of these.
- ___ 20. Loss of detail in a digitally processed image:
- a. occurs because of the number of conversions.
 - b. is extremely minimal compared with film/screen.
 - c. is equal to film/screen.
 - d. has almost no impact on the image.
- ___ 21. The longer an image is stored in the computed radiography (CR) cassette, the:
- a. more detailed the processed image.
 - b. more energy is lost by the electrons.
 - c. easier the image is to process.
 - d. slower the processing time.
- ___ 22. Automatic rescaling means that images are produced, regardless of the amount of exposure, with:
- a. uniform size and shape.
 - b. uniform contrast and density.
 - c. variable size and shape.
 - d. variable contrast and density.
- ___ 23. Changing the slope of the look-up table graph will increase or decrease:
- a. density.
 - b. the number of pixels.
 - c. the matrix size.
 - d. contrast.
- ___ 24. Changing the steepness of the exposure gradient:
- a. varies density.

- b. determines spatial frequency.
 - c. controls image contrast.
 - d. has no effect on the image.
- ___ 25. The improper algorithm application may result in:
- a. enhanced contrast.
 - b. improved resolution.
 - c. repeat examinations.
 - d. degradation of the image.
- ___ 26. The more manipulation of the image, the greater the:
- a. amount of resolution.
 - b. loss of information.
 - c. quality of the image.
 - d. radiologist manipulation.
- ___ 27. Low-pass filtering is also known as:
- a. evening.
 - b. smoothing.
 - c. masking.
 - d. marking.
- ___ 28. High-pass filtering is useful for enhancing:
- a. small structures.
 - b. fine bone tissues.
 - c. large bony structures.
 - d. organs and soft tissue.
- ___ 29. Averaging the frequency of each pixel with surrounding pixel values to remove high-frequency noise is called:
- a. high-pass filtering.
 - b. low-pass filtering.
 - c. edge enhancement.
 - d. noise enhancement.
- ___ 30. Window width controls the ratio of black and white, also known as:
- a. window.
 - b. level.
 - c. contrast.
 - d. matrix.
- ___ 31. An image manipulation process that fills in the background so that it is darkened is known as:
- a. window.
 - b. level.
 - c. shuttering.
 - d. collimation.
- ___ 32. The process of joining two or more images into one continuous image is known as image:
- a. connection.

- b. annotation.
- c. stitching.
- d. lacing.

- _____ 33. The workstation function that allows selection of preset terms or manual text input is termed image:
a. connection.
b. annotation.
c. stitching.
d. lacing.
- _____ 34. Input of annotation for identification of the patient's left or right side:
a. should take the place of the technologist's anatomy markers.
b. should be used in conjunction with the technologist's markers.
c. eliminates the need for any other type of anatomy markers.
d. none of the above.
- _____ 35. Proper patient demographic input ensures:
a. multiple records on each patient.
b. linking of all the patient's files.
c. multiple versions of the patient's name.
d. an increase in the amount of data tracking.
- _____ 36. Proper patient demographic input is the responsibility of the:
a. technologist
b. QC manager.
c. radiologist.
d. transporter.
- _____ 37. The PSP cassette is backed by aluminum that:
a. reflects x-rays.
b. absorbs backscatter x-rays.
c. captures the image.
d. transmits x-rays.
- _____ 38. The purpose of the barcode label is to match the image information with the:
a. imaging plate.
b. patient identifier.
c. technologist.
d. radiographic room.
- _____ 39. Which of the following does not determine PSP resolution?
a. Phosphor layer thickness
b. Pixel size
c. The number of pixels
d. Laser scan speed
- _____ 40. The amount of detail present in any image is known as _____ resolution.
a. contrast
b. density

- c. spatial
- d. optical

- ___ 41. The selection of the incorrect body part from the examination menu may result in:
 - a. no image.
 - b. image misinterpretation.
 - c. proper density and contrast.
 - d. no difference in image sharpness.

- ___ 42. The range of kVp that can be used with PSP systems is:
 - a. 45 to 120.
 - b. 55 to 130.
 - c. 65 to 120.
 - d. 75 to 130.

- ___ 43. When insufficient light is produced by the imaging plate phosphor, the image will:
 - a. not be formed.
 - b. be grainy.
 - c. be dark.
 - d. be detailed.

- ___ 44. Quantum mottle is caused by:
 - a. excessive mA-s.
 - b. excessive kVp.
 - c. insufficient distance.
 - d. insufficient light.

- ___ 45. Which of the following should be considered when selecting the PSP cassette?
 - a. size and speed.
 - b. type and speed.
 - c. size and type.
 - d. none of these.

- ___ 46. Using an FOV that is much larger than the part being examined will:
 - a. increase resolution.
 - b. decrease the size of the matrix.
 - c. decrease the sampling rate.
 - d. decrease resolution.

- ___ 47. The higher the number of pixels in a matrix, the:
 - a. higher the image resolution.
 - b. lower the image resolution.
 - c. lack of effect on image resolution.
 - d. smaller the image.

- ___ 48. Grid use for PSP examinations is more critical than in film/screen radiography because CR:
 - a. examinations produce more scatter.
 - b. imaging plates record more densities.
 - c. imaging plates record less scatter.

- d. examinations requires much higher kVp values.
- ___ 49. Which of the following require more critical beam centering?
- a. Parallel grids
 - b. Focused grids
 - c. Low-ratio grids
 - d. Low-frequency grids
- ___ 50. Collimation to a smaller area:
- a. increases scatter.
 - b. increases amount of tissue irradiated.
 - c. decreases resolution.
 - d. decreases Compton interactions.
- ___ 51. The exposure indicator number is:
- a. an accurate measure of the patient dose.
 - b. an indication of radiation absorbed by the imaging plate.
 - c. both a and b.
 - d. neither a nor b.
- ___ 52. A PACS consists of:
- 1. image acquisition.
 - 2. display workstation.
 - 3. archive servers.
- a. 1 and 2
 - b. 1 and 3
 - c. 2 and 3
 - d. 1, 2, and 3
- ___ 53. A universally accepted standard for exchanging medical imaging via a networked set of display workstations, archive, and imaging modalities is:
- a. HIPAA.
 - b. DICOM.
 - c. HL-7.
 - d. all of the above.
- ___ 54. Any computer that a health care worker uses to view a digital image is a(n):
- a. archive.
 - b. Web server.
 - c. image manager.
 - d. display workstation.
- ___ 55. Which part of the PACS houses all of the historic digital image data along with the current digital data being generated by the modalities?
- a. Archive
 - b. Display workstation
 - c. File room
 - d. Review workstation

- ___ 56. Reading images on a computer screen is known as _____ reporting.
- soft copy
 - hard copy
 - computer
 - both a and b
- ___ 57. The acronym RIS stands for _____ system.
- radiology integrated
 - redundant information
 - radiology information
 - reading integrated
- ___ 58. Which set of functions is used to move through images, series, studies, and patients?
- Navigation
 - Image management
 - Image manipulation and enhancement
 - Advanced workstation
- ___ 59. Which function determines how images are displayed on the monitor(s)?
- Series navigation
 - Hanging protocol
 - Flip and rotate
 - All of the above
- ___ 60. Which function allows the user to move through a series of images frame by frame?
- Pan and zoom
 - Hanging protocol
 - Cine
 - Both a and b
- ___ 61. Which function represents the range of gray values that are being viewed on the monitor?
- Window
 - Level
 - Contrast
 - Density
- ___ 62. Which function can be used to orient the image in the anatomic hanging position?
- Pan and zoom
 - ROI
 - Annotations
 - Flip and rotate
- ___ 63. Which function increases the size of an area on the image?
- Pan and zoom
 - ROI
 - Annotations
 - Flip and rotate
- ___ 64. Which of the following measurements are commonly found on a PACS workstation?

1. ROI
2. Distance
3. Angle
- a. 1 and 2
- b. 1 and 3
- c. 2 and 3
- d. 1, 2, and 3

- _____ 65. Which advanced function allows the user to put multiple images together into one single image, such as in a scoliosis series?
- a. Image postprocessing
 - b. MPR
 - c. Stitching
 - d. VRT
- _____ 66. Which term is used to describe the process of transferring images to remote locations for reading by a radiologist?
- a. Long-range image viewing
 - b. Teleradiology
 - c. Computed radiology
 - d. Distance reading
- _____ 67. Which of the following are common uses of a film digitizer?
1. Compare outside films
 2. Computed aided diagnosis
 3. Remote viewing of analog images
 - a. 1 and 2
 - b. 1 and 3
 - c. 2 and 3
 - d. 1, 2, and 3
- _____ 68. Which term describes the technology that allows a film to be digitized and then analyzed by a computer to alert the radiologist of possible questionable areas on a radiograph?
- a. CAD
 - b. TFT
 - c. CCD
 - d. Teleradiology
- _____ 69. A film imager is also known as a film:
- a. digitizer.
 - b. printer.
 - c. duplicator.
 - d. none of the above.
- _____ 70. Which of the following are common uses of imagers?
1. Backup
 2. Legal cases
 3. Outside physicians

- a. 1 and 2
- b. 1 and 3
- c. 2 and 3
- d. 1, 2, and 3

- _____ 71. Other than printing films, another alternative would be to:
- a. digitize the image into the PACS.
 - b. have the physician come to the hospital to view the images.
 - c. burn images to an optical disk.
 - d. do both a and b.
- _____ 72. The range of the histogram data set that should be included in the displayed image is determined by the:
- a. LUT
 - b. EI
 - c. VOIs
 - d. LCD
- _____ 73. All of the data from the entire IP (including scatter outside the exposed field) may be included in the histogram analysis if:
- a. Only one edge of the collimated field is identified.
 - b. Only three edges of the collimated field are identified.
 - c. All four edges of the collimated field are identified.
 - d. All of the above
- _____ 74. Based on the histogram analysis, consistent image brightness is accomplished through:
- a. Adjustment of window width
 - b. Automatic rescaling
 - c. Manipulation of the exposure indicator
 - d. Manipulation of the LUT
- _____ 75. The numerical value indicating the level of radiation exposure to the digital IR is the:
- a. VOI
 - b. Histogram
 - c. Exposure indicator
 - d. LUT
- _____ 76. The pixel bit depth determines the image's:
- a. Brightness
 - b. Contrast
 - c. Spatial resolution
 - d. Contrast resolution
- _____ 77. Decreasing the window level will result in an image with:
- a. Lower contrast
 - b. Higher contrast
 - c. Decreased brightness
 - d. Increased brightness
- _____ 78. Increasing the window width will result in an image with:
- a. Lower contrast
 - b. Higher contrast
 - c. Decreased brightness

d. Increased brightness

- _____ 79. This postprocessing technique reduces the visibility of image noise.
- Smoothing
 - Contrast enhancement
 - Edge enhancement
 - Subtraction
- _____ 80. This postprocessing technique improves the visibility of small, high contrast structures.
- Smoothing
 - Contrast enhancement
 - Edge enhancement
 - Subtraction
- _____ 81. The communication standard for medical information is:
- PACS
 - HL7
 - DICOM
 - RIS
- _____ 82. The _____ absorbs electrons and emits light.
- Input phosphor
 - Output phosphor
 - Photocathode
 - Accelerating anode
- _____ 83. The _____ absorbs x-rays and emits light.
- Input phosphor
 - Output phosphor
 - Photocathode
 - Accelerating anode
- _____ 84. This part of the image intensifier absorbs light and produces electrons.
- Input phosphor
 - Output phosphor
 - Photocathode
 - Electrostatic focusing lenses
- _____ 85. The gain related to the decrease in size from the input to the output phosphor is the:
- Brightness gain
 - Flux
 - Minification gain
 - Conversion factor
- _____ 86. This is measured in $\text{cd/m}^2/\text{mR/s}$.
- Brightness gain
 - Flux
 - Minification gain
 - Conversion factor
- _____ 87. The formula for brightness gain is:
- Brightness gain = minification gain – flux gain
 - Brightness gain = minification gain / flux gain

- c. Brightness gain = minification gain \times flux gain
- d. None of the above

- ___ 88. In reference to image intensification, the function that adjusts and maintains the overall image brightness and contrast during the fluoroscopic procedure is:
- a. DQE
 - b. APR
 - c. ABC
 - d. AEC
- ___ 89. Magnification of the fluoroscopic image results in improved:
- a. Brightness
 - b. Spatial resolution
 - c. Contrast
 - d. Exposure
- ___ 90. A disadvantage of using magnification mode during fluoroscopy is:
- a. The image has less resolution.
 - b. The image brightness is inconsistent.
 - c. The patient receives additional dose.
 - d. None of the above
- ___ 91. In fluoroscopy, shape distortion is caused by:
- a. Angling the tube
 - b. Angling the image intensifier
 - c. The curved shape of the photocathode
 - d. The position of the electrostatic focusing lenses
- ___ 92. Distortion of the fluoroscopic image that appears as unequal magnification is:
- a. Noise
 - b. Pincushion appearance
 - c. Vignetting
 - d. Magnification
- ___ 93. A loss of brightness around the edge of the fluoroscopic image due to the curve of the photocathode is:
- a. Noise
 - b. Pincushion appearance
 - c. Vignetting
 - d. Magnification
- ___ 94. Increasing the mA is the way to correct a fluoroscopic image that has:
- a. Noise
 - b. Pincushion appearance
 - c. Vignetting
 - d. Magnification
- ___ 95. The fiberoptic bundle or optical lens system is used to:
- a. Deliver the image from the camera to the television monitor
 - b. Record the fluoroscopic image
 - c. Link the output phosphor and camera or CCD
 - d. None of the above
- ___ 96. The analog to digital converter:

- a. Makes the electrical signal understandable to the computer
 - b. Determines the contrast resolution of the system
 - c. Determines the image matrix
 - d. All of the above
- ___ 97. Digital fluoroscopy is improved by using:
- a. A vidicon camera
 - b. Videotape
 - c. A beam splitting mirror
 - d. A CCD
- ___ 98. The newest fluoroscopy systems use a flat-panel detector:
- a. To display the spot images during fluoroscopy
 - b. To record the overhead images following fluoroscopy
 - c. In place of the image intensifier
 - d. In addition to the image intensifier
- ___ 99. For detectors to produce high-quality fluoroscopic images, they must be able to
- a. respond very quickly
 - b. respond many times in a row
 - c. have application-specific integrated circuits for noise reduction
 - d. all of the above
- ___ 100. A “cassette-based” digital imaging system is termed
- a. digital radiography (DR).
 - b. computed radiography (CR).
 - c. direct conversion.
 - d. indirect conversion.
- ___ 101. The purpose of the photostimulable phosphor plate is to
- a. remove the images during processing.
 - b. erase the images after processing.
 - c. store the image of the body part until processed.
 - d. serve as the archive for digital images.
- ___ 102. Quantum mottle occurs in digital images if
- a. the time is set too long.
 - b. the mA is set too high.
 - c. the kVp is set too high.
 - d. there are not enough photons reaching the IR.
- ___ 103. Which of the following should be used when imaging body parts that have extreme differences in tissue thickness?
- a. Larger IR
 - b. Shorter SID
 - c. Larger focal spot
 - d. Compensating filter
- ___ 104. Which of the following is a true statement regarding the centering of the body part when using digital systems?

- a. The part must be placed off-center by about 2 cm.
 - b. The part must be placed in the center of the plate or detector.
 - c. The part should be placed near one of the four edges.
 - d. The part can be placed anywhere on the plate or detector.
- ___ 105. The storage phosphors in the CR plate are hypersensitive to
- a. small levels of scatter radiation exposure.
 - b. large levels of scatter radiation exposure.
 - c. low kVp or low mA settings.
 - d. incandescent or fluorescent room light.
- ___ 106. After the imaging plate is scanned in the CR reader and the image sent to storage, the phosphor is exposed to a _____ to erase the anatomical image.
- a. white light
 - b. laser beam
 - c. electric current
 - d. electric charge
- ___ 107. A charge-coupled device (CCD) is used in an indirect conversion DR system to
- a. convert x-rays into a light.
 - b. convert light into an electrical signal.
 - c. allow readout of the x-ray image.
 - d. store the x-ray image.
- ___ 108. Which of the following matrix sizes will produce the best spatial resolution?
- a. 500 × 1000 matrix
 - b. 1000 × 1000 matrix
 - c. 2000 × 2000 matrix
 - d. 3000 × 3000 matrix
- ___ 109. The ability to distinguish anatomical structures of similar subject contrast is termed
- a. quantum mottle.
 - b. dynamic range.
 - c. contrast resolution.
 - d. spatial resolution.
- ___ 110. The ability of the digital system to convert the x-ray input electric signal into a useful radiographic image is termed the
- a. dynamic range.
 - b. contrast resolution.
 - c. signal-to-noise ratio (SNR).
 - d. shuttering.
- ___ 111. “Noise” refers to the amount of information that is not useful in the radiographic image. This noise is referred to as
- a. quantum mottle.
 - b. shuttering.
 - c. dynamic range.
 - d. signal-to-noise ratio (SNR).

- ___ 112. Which control on the viewing station can blacken the clear or white areas around the collimation edges of a radiograph?
- Cropping
 - Image stitching
 - Window width
 - Window level
- ___ 113. One of the most important aspects of setting the exposure factors when using digital systems is to ensure that the
- grid is used.
 - SID is set correctly.
 - mAs is set correctly.
 - kVp is set correctly.
- ___ 114. Which of the following tells the operator that the correct exposure has been received by the phosphors in the imaging plate?
- Exposure indicator number
 - Signal-to-noise ratio (SNR)
 - Health level-7
 - DICOM gray-scale function
- ___ 115. What is the name of the computer software function that allows adjustment of the radiographic image after it has been processed?
- Image annotation
 - Postprocessing
 - Edge enhancement
 - DICOM gray-scale function
- ___ 116. The universally accepted standard for exchanging radiographic images inside and outside the institution, and among all manufacturers, is which of the following?
- DICOM
 - Health level-7
 - DICOM gray-scale function
 - ALARA
- ___ 117. Which radiographic examination would require “image stitching” of several separate images?
- The leg
 - All femur radiographs
 - Full spine for scoliosis
 - Abdomens on patients taller than 6 ft
- ___ 118. The artifact that will occur when the grid lines are not aligned with the CR reader’s laser light is
- quantum mottle.
 - moiré pattern.
 - ghost images.
 - light spots.
- ___ 119. When there is foreign matter inside the CR imaging plate, an artifact may be shown called

- a. quantum mottle.
- b. moiré pattern.
- c. light spots.
- d. extraneous line patterns.

- ___ 120. Which of the following artifacts can appear in the radiographic image if the CR imaging plate is not erased properly?
- a. Light spots
 - b. Edge enhancement
 - c. Quantum mottle
 - d. Phantom or ghost images
- ___ 121. The artifact that is caused by noise in the digital system's electronics that creates lengthwise or crosswise lines is called a(n)
- a. moiré pattern.
 - b. ghost image.
 - c. scratch or tear.
 - d. extraneous line pattern.
- ___ 122. Which of the following artifacts can occur if the CR imaging plate receives too much background or scatter radiation?
- a. Fogging
 - b. Ghost or phantom images
 - c. Light spots
 - d. Quantum mottle
- ___ 123. Which of the following should be checked regularly on the viewing monitor?
1. Viewing surface and air flow
 2. Image quality using a test pattern
 3. Resolution
- a. 1 and 2
 - b. 1 and 3
 - c. 2 and 3
 - d. 1, 2, and 3
- ___ 124. What is the name of the technique in which each pixel's frequency is averaged with the surrounding tissues' pixel values in an effort to reduce noise in the image?
- a. Edge enhancement
 - b. Postprocessing
 - c. Smoothing
 - d. Rescaling
- ___ 125. What is the name of the processing technique that allows the x-ray images to be produced with uniform density and contrast, regardless of the amount of exposure?
- a. Direct conversion
 - b. Indirect conversion
 - c. Rescaling
 - d. Edge enhancement

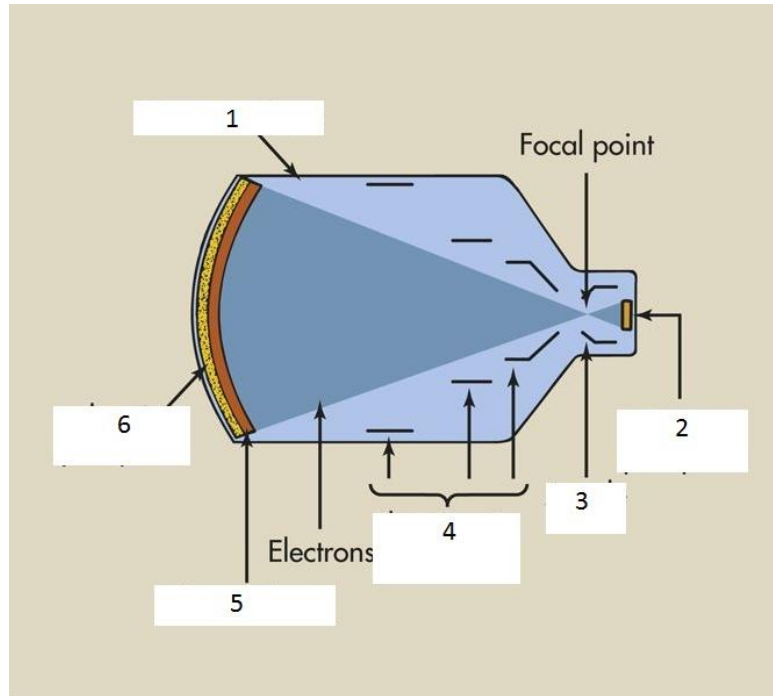
- ___ 126. This occurs when there may be a defect in a component of the computer screen matrix that may cause a loss of patient information:
- Phantom images.
 - Quantum mottle.
 - Smoothing.
 - Dead pixels.
- ___ 127. If the CR reader does not erase the image plate completely, which artifact will appear?
- Phantom
 - Fogging
 - Light spots
 - Extraneous line patterns
- ___ 128. Which of the following contains a file of stored images for each projection, which are then referenced during processing of the digital image?
- The DICOM
 - Look up table
 - The thin film transistor (TFT)
 - The analog to digital converter (ADC)
- ___ 129. A graph of the minimum and maximum signals in the digital image is called the
- look up table (LUT).
 - histogram.
 - signal to noise ratio (SNR).
 - modulation transfer function (MTF).

Figure 7
Artifact



- ____ 130. *Pertaining to the figure 7, answer the following question.*
- The high brightness radiographic artifacts seen in this lateral cervical radiograph are caused by:
- Mattress springs
 - High voltage cables
 - Cassette strips
 - grid lead strips

Figure 10
Image intensifier



- ___ 131. ***Pertaining to the figure 10:***
The components represented by number 2 is in is:
- | | |
|--------------------|-----------------|
| a. input phosphor | c. photocathode |
| b. output phosphor | d. anode |
- ___ 132. The variation in exposure rate along the longitudinal axis of the x-ray tube, resulting from the absorption of radiation by the rotating anode disk, is called the:
- | | |
|----------------------------|-----------------------|
| a. Anode reflection effect | c. Anode angle effect |
| b. Anode stem effect | d. Anode heel effect |
- ___ 133. Which of the following devices is employed in a modern radiographic unit to selectively remove or prevent low energy x-rays exiting from the tube from reaching the patient?
- | | |
|--------------------------------|---------------------------|
| a. Diagnostic filtration | c. Radiographic grids |
| b. Variable aperture diaphragm | d. Carbon-fiber tabletops |
- ___ 134. All of the following components are normally located in the secondary portion of a modern x-ray circuit EXCEPT:
- | | |
|-------------------------------------|--|
| a. The milliamperere-seconds meter | c. The high tension cables |
| b. The solid state diode rectifiers | d. The kilovoltage peak indicator or display |
- ___ 135. Which combination of exposure settings will result in the electron stream in the x-ray tube possessing the highest kinetic energy?
- | | |
|-------------------------------------|-------------------------------------|
| a. 100 mA, 120 milliseconds, 92 kVp | c. 100 mA, 100 milliseconds, 83 kVp |
| b. 100 mA, 360 milliseconds, 64 kVp | d. 100 mA, 100 milliseconds, 78 kVp |
- ___ 136. The rectification of high voltage alternating current into pulsating direct current in a 3-phase radiographic unit occurs between the secondary of the high tension transformer and the:
- | | |
|--------------------|----------------------|
| a. Autotransformer | c. Inverter circuit |
| b. X-ray tube | d. Thermionic diodes |
- ___ 137. The hardening of an x-ray beam is most easily accomplished by the:

- a. Selective addition of high energy particulates to the x-ray beam
 - b. Selective addition of high energy photons to a heterogeneous x-ray beam
 - c. Selective removal of low energy photons from a heterogeneous x-ray beam
 - d. Selective removal of particulate emission from the x-ray beam
- ___ 138. In order to employ a picture archival and communication system (PACS) for the storage of hard copy digitized radiographic images, the images must first be:
- a. Converted into a digital form
 - b. Converted into an analog form
 - c. Converted into a dynamic form
 - d. Converted into a subtracted form
- ___ 139. A damaged rotor bearing in the x-ray tube should be suspected if:
- a. Fluctuations of the mA meter is detected during the radiographic exposure
 - b. The operator is unable to obtain ready light prior to the exposure
 - c. There is a premature termination of the exposure
 - d. A loud grinding noise is heard when the prep or boost stage of the exposure is activated
- ___ 140. A satisfactory radiographic image of the abdomen is obtained using an automatic exposure controlled unit. Which of the following is likely to occur if a second image is obtained after the introduction of two cups of barium?
- a. The brightness is likely to increase
 - b. The brightness is likely to decrease
 - c. The exposure time is likely to increase
 - d. The kilovoltage setting is likely to decrease
- ___ 141. In a fine line radiographic grid, the majority of secondary scattered radiation is absorbed by the:
- a. Aluminum interspace material
 - b. Lucite interspace material
 - c. Lead strips
 - d. Aluminum strips
- ___ 142. A radiographic grid is designed with a number of lead strips 6 microns thick, 60 microns in height, and separated by numerous 7.5 microns thick aluminum spacers. This grid has a/an:
- a. 5:1 ratio
 - b. 6:1 ratio
 - c. 8:1 ratio
 - d. 12:1 ratio
- ___ 143. A radiographic image of the thoracic spine is obtained on a patient with an automatic exposure controlled (AEC) unit using 300 mA and 82 kVp. If the unit has a backup timer setting of 200 milliseconds and a 20 millisecond minimum response time, which of the following exposures will be permitted?
1. *6 mAs* 2. *14 mAs* 3. *56 mAs*
- a. 1 & 2 only
 - b. 1 & 3 only
 - c. 2 & 3 only
 - d. All of the above
- ___ 144. During the radiographic imaging of a thick body part, the use of moving grids is generally favored over stationary grids of the same ratio and frequency because:
- a. The appearance of the grid's lines is reduced
 - b. The amount of grid cutoff is reduced
 - c. Greater tube angulations are permitted
 - d. The object-to-image receptor distance is reduced
- ___ 145. In a digital imaging system, the use of a 12 bit analog to digital converter (ADC) will enable each pixel to have:
- a. 34 possible gray scale values
 - b. 256 possible gray scale values
 - c. 512 possible gray scale values
 - d. 4096 possible gray scale values

Figure 3

C-spine radiograph



- ___ 146. *Pertaining to the figure 3, answer the following question.*
1. The artifact seen over the lower cervical vertebrae on this radiographic image most likely represents:
 - a. Earrings that were not removed by the patient
 - b. An internal spinal fixation device
 - c. An artificial voice box
 - d. A nasogastric tube
- ___ 147. The scale contrast appearing in a radiographic image is related to all of the following factors EXCEPT:
- a. The thickness of the body part
 - b. The physical density of the patient
 - c. The milliamperage-seconds value selection
 - d. The kilovoltage peak value selection
- ___ 148. The pulsing of an x-ray during digital fluoroscopy (DF) is required to reduce the amount of heat that is produced during imaging and:
- a. Reduces the effects of patient motion
 - b. Increases the spatial resolution of the image
 - c. Increases the acquisition speed
 - d. Reduces the exposure to the patient
- ___ 149. The process by which a crystalline material gives off visible light in response to high energy photons is termed:

- a. Incandescence
- b. Convergence

- c. Luminescence
- d. Photo electrolysis

- ____ 150. Which of the following pathologic conditions will most likely require an increase in exposure settings in order to maintain the desired optical density of the radiographic image?
- a. Osteoporosis and emphysema
 - b. Osteopetrosis and Paget's disease
 - c. Atrophy and necrosis
 - d. Cancer and pneumothorax

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Answer Section

MULTIPLE CHOICE

1. ANS: C PTS: 1 REF: 8
OBJ: Compare and contrast the latent image formation process for indirect and direct capture DR.
2. ANS: C PTS: 1 REF: 12
OBJ: Compare and contrast the latent image formation processes.
3. ANS: C PTS: 1 REF: 14
OBJ: Explain what a PACS is and how it is used.
4. ANS: B PTS: 1 REF: 24
OBJ: Differentiate between analog and digital images.
5. ANS: D PTS: 1 REF: 25
OBJ: Relate pixel size, matrix size, and FOV to each other.
6. ANS: B PTS: 1 REF: 25
OBJ: Define pixel and image matrix and characteristics of each.
7. ANS: B PTS: 1 REF: 25
OBJ: Define pixel and image matrix and characteristics of each.
8. ANS: C PTS: 1 REF: 25
OBJ: Define pixel and image matrix and characteristics of each.
9. ANS: A PTS: 1 REF: 26
OBJ: Discriminate between standard units of measure for exposure indicators.
10. ANS: B PTS: 1 REF: 29
OBJ: Discuss the differences between spatial and contrast resolution.
11. ANS: C PTS: 1 REF: 30
OBJ: Discuss the differences between spatial and contrast resolution.
12. ANS: B PTS: 1 REF: 30
OBJ: Discuss the differences between spatial and contrast resolution.
13. ANS: D PTS: 1 REF: 33 OBJ: Define exposure latitude.
14. ANS: B PTS: 1 REF: 38
OBJ: Describe the formation of an image histogram.
15. ANS: A PTS: 1 REF: 38
OBJ: Describe the formation of an image histogram.
16. ANS: B PTS: 1 REF: 39
OBJ: Describe the formation of an image histogram.
17. ANS: B PTS: 1 REF: 39
OBJ: Describe the formation of an image histogram.
18. ANS: B PTS: 1 REF: 40 OBJ: State the Nyquist theorem.
19. ANS: A PTS: 1 REF: 39
OBJ: Describe the formation of an image histogram.
20. ANS: A PTS: 1 REF: 41 OBJ: State the Nyquist theorem.
21. ANS: B PTS: 1 REF: 41 OBJ: State the Nyquist theorem.
22. ANS: B PTS: 1 REF: 41 OBJ: Discuss automatic rescaling.
23. ANS: D PTS: 1 REF: 42
OBJ: List the functions of contrast enhancement parameters.
24. ANS: C PTS: 1 REF: 43
OBJ: List the functions of contrast enhancement parameters.

25. ANS: D PTS: 1 REF: 43
OBJ: List the functions of contrast enhancement parameters.
26. ANS: B PTS: 1 REF: 43
OBJ: List the functions of contrast enhancement parameters.
27. ANS: B PTS: 1 REF: 44
OBJ: Discuss the purpose and function of image manipulation factors.
28. ANS: D PTS: 1 REF: 44
OBJ: Discuss the purpose and function of image manipulation factors.
29. ANS: B PTS: 1 REF: 44
OBJ: Discuss the purpose and function of image manipulation factors.
30. ANS: C PTS: 1 REF: 46
OBJ: Discuss the purpose and function of image manipulation factors.
31. ANS: C PTS: 1 REF: 46
OBJ: Discuss the purpose and function of image manipulation factors.
32. ANS: C PTS: 1 REF: 46
OBJ: Discuss the purpose and function of image manipulation factors.
33. ANS: B PTS: 1 REF: 47
OBJ: Discuss the purpose and function of image manipulation factors.
34. ANS: B PTS: 1 REF: 47
OBJ: Discuss the purpose and function of image manipulation factors.
35. ANS: B PTS: 1 REF: 49
OBJ: Describe the major factors in image management.
36. ANS: A PTS: 1 REF: 49
OBJ: Describe the major factors in image management.
37. ANS: B PTS: 1 REF: 59
OBJ: Describe the basic construction of a PSP cassette and imaging plate.
38. ANS: B PTS: 1 REF: 62
OBJ: Describe the basic construction of a PSP cassette and imaging plate.
39. ANS: D PTS: 1 REF: 67
OBJ: Compare conventional radiographic screen and film speed to PSP systems.
40. ANS: C PTS: 1 REF: 67
OBJ: Explain the process of reading and erasing the imaging plate.
41. ANS: B PTS: 1 REF: 70
OBJ: Discuss the importance of matching the body part being examined to the examination menu.
42. ANS: A PTS: 1 REF: 71
OBJ: Discuss the selection of technical factors for density, contrast, and penetration.
43. ANS: B PTS: 1 REF: 72
OBJ: Discuss the selection of technical factors for density, contrast, and penetration.
44. ANS: D PTS: 1 REF: 72
OBJ: Discuss the selection of technical factors for density, contrast, and penetration.
45. ANS: C PTS: 1 REF: 72
OBJ: Describe the imaging plate and grid selection process.
46. ANS: D PTS: 1 REF: 73
OBJ: Describe the imaging plate and grid selection process.
47. ANS: A PTS: 1 REF: 73
OBJ: Describe the imaging plate and grid selection process.
48. ANS: B PTS: 1 REF: 73
OBJ: Describe the imaging plate and grid selection process.
49. ANS: B PTS: 1 REF: 74

- OBJ: Describe the imaging plate and grid selection process.
50. ANS: D PTS: 1 REF: 75
OBJ: Discuss the importance of preprocessing collimation and image marking.
51. ANS: B PTS: 1 REF: 80
OBJ: Compare exposure indicators for the major computed radiography (CR) manufacturers and vendors.
52. ANS: D PTS: 1 REF: 152 OBJ: Define PACS.
53. ANS: B PTS: 1 REF: 152 OBJ: Define PACS.
54. ANS: D PTS: 1 REF: 155
OBJ: Compare and contrast the various types of PACS display workstations.
55. ANS: A PTS: 1 REF: 156
OBJ: Define picture archiving and communication system (PACS).
56. ANS: A PTS: 1 REF: 153
OBJ: Define picture archiving and communication system (PACS).
57. ANS: C PTS: 1 REF: 157
OBJ: Differentiate among the different types of digital imaging workflow.
58. ANS: A PTS: 1 REF: 171
OBJ: Summarize the common functions found on a PACS workstation.
59. ANS: B PTS: 1 REF: 172
OBJ: Summarize the common functions found on a PACS workstation.
60. ANS: C PTS: 1 REF: 172
OBJ: Summarize the common functions found on a PACS workstation.
61. ANS: A PTS: 1 REF: 173
OBJ: Summarize the common functions found on a PACS workstation.
62. ANS: D PTS: 1 REF: 173
OBJ: Summarize the common functions found on a PACS workstation.
63. ANS: A PTS: 1 REF: 174
OBJ: Summarize the common functions found on a PACS workstation.
64. ANS: D PTS: 1 REF: 175
OBJ: Summarize the common functions found on a PACS workstation.
65. ANS: C PTS: 1 REF: 180
OBJ: Describe the situations and users that may require advanced PACS workstation functions.
66. ANS: B PTS: 1 REF: 203
OBJ: Discuss the common uses for imagers in a picture archival and communication system (PACS) environment.
67. ANS: D PTS: 1 REF: 203
OBJ: Compare and contrast the various long-term archive technologies used in current picture archival and communication systems.
68. ANS: A PTS: 1 REF: 203
OBJ: Compare and contrast the various long-term archive technologies used in current picture archival and communication systems.
69. ANS: B PTS: 1 REF: 203
OBJ: Compare and contrast dry laser imager technology with wet laser imager technology.
70. ANS: D PTS: 1 REF: 205
OBJ: Discuss the common uses for imagers in a PACS environment.
71. ANS: C PTS: 1 REF: 206
OBJ: Identify common uses for CD/DVD burners in a PACS environment.
72. ANS: C
The values of interest (VOIs) determine which values from the histogram analysis will be used in the image.

- PTS: 1 OBJ: 1
73. ANS: A
If three or four field edges are identified, the computer will accurately eliminate the data from outside the exposed area of the IP. If only one edge of the field is identified, the computer includes all data in the histogram analysis.
- PTS: 1 OBJ: 1
74. ANS: B
Automatic rescaling adjusts the data in the histogram analysis to produce consistent image brightness.
- PTS: 1 OBJ: 1
75. ANS: C
The exposure indicator describes the amount of exposure to the digital IR.
- PTS: 1 OBJ: 2
76. ANS: D
Contrast resolution is determined by the pixel bit depth. The greater the pixel bit depth, the more shades of gray to be used.
- PTS: 1 OBJ: 4
77. ANS: C
A lower window level results in an image with decreased brightness.
- PTS: 1 OBJ: 6
78. ANS: A
Increasing window width results in a digital image with lower contrast.
- PTS: 1 OBJ: 6
79. ANS: A
Smoothing reduces the visibility of image noise.
- PTS: 1 OBJ: 6
80. ANS: C
Edge enhancement makes structures more visible.
- PTS: 1 OBJ: 6
81. ANS: B
HL7 is the communication standard for medical information, while DICOM is the standard for images.
- PTS: 1 OBJ: 7
82. ANS: B
The output phosphor absorbs electrons and emits light.
- PTS: 1 OBJ: 2
83. ANS: A
The input phosphor absorbs x-rays and emits light.
- PTS: 1 OBJ: 2
84. ANS: C
The photocathode absorbs light and produces electrons.

- PTS: 1 OBJ: 2
85. ANS: C
The image at the output phosphor is brighter in part because it is significantly smaller than the same image at the input phosphor.
- PTS: 1 OBJ: 3
86. ANS: D
The conversion factor, another descriptor of the overall ability of an image intensifier to create a brighter image, is measured in $\text{cd}/\text{m}^2/\text{mR}/\text{s}$.
- PTS: 1 OBJ: 3
87. ANS: C
Brightness gain = minification gain \times flux gain
- PTS: 1 OBJ: 3
88. ANS: C
ABC, or automatic brightness control, maintains the brightness and contrast of the fluoroscopic image during the procedure.
- PTS: 1 OBJ: 4
89. ANS: B
Using the magnification mode improves spatial resolution of the fluoroscopic image.
- PTS: 1 OBJ: 5
90. ANS: C
Additional x-ray photons must leave the patient and be absorbed by the image intensifier when magnification mode is used, resulting in increased patient dose.
- PTS: 1 OBJ: 5
91. ANS: C
Shape distortion during fluoroscopy is the result of the curved shape of the input phosphor and photocathode.
- PTS: 1 OBJ: 6
92. ANS: B
Pincushion appearance is the distortion of the fluoroscopic image that appears as unequal magnification.
- PTS: 1 OBJ: 6
93. ANS: C
Vignetting is the loss of brightness around the periphery of the fluoroscopic image.
- PTS: 1 OBJ: 6
94. ANS: A
When a fluoroscopic image has noise, or is noisy, the quantity of radiation (mA) must be increased because the issue is too few photons being used to create the image.
- PTS: 1 OBJ: 6
95. ANS: C
The fiber optic bundle or optical lens system is used to link or couple the camera or CCD to the output phosphor of the image intensifier.

- PTS: 1 OBJ: 7
96. ANS: D
The ADC converts analog data (electrical current) to digital data (1s and 0s). Each ADC has a set number of bits which determine image contrast resolution and the size of the image matrix.
- PTS: 1 OBJ: 9
97. ANS: D
A CCD used for converting the light image to an electronic image greatly improves digital imaging.
- PTS: 1 OBJ: 9
98. ANS: C
The newest fluoroscopy systems use a flat-panel detector in place of the image intensifier.
- PTS: 1 OBJ: 9
99. ANS: D
To produce quality fluoroscopic images with digital detectors, they have to be able to respond quickly to the presence of x-rays, recover quickly so they can produce new images very quickly, and have an ASIC in place to reduce noise.
- PTS: 1 REF: 213 OBJ: 6
100. ANS: B PTS: 1
101. ANS: C PTS: 1
102. ANS: D PTS: 1
103. ANS: D PTS: 1
104. ANS: B PTS: 1
105. ANS: A PTS: 1
106. ANS: A PTS: 1
107. ANS: B PTS: 1
108. ANS: D PTS: 1
109. ANS: C PTS: 1
110. ANS: C PTS: 1
111. ANS: A PTS: 1
112. ANS: A PTS: 1
113. ANS: D PTS: 1
114. ANS: A PTS: 1
115. ANS: B PTS: 1
116. ANS: A PTS: 1
117. ANS: C PTS: 1
118. ANS: B PTS: 1
119. ANS: C PTS: 1
120. ANS: D PTS: 1
121. ANS: D PTS: 1
122. ANS: A PTS: 1
123. ANS: D PTS: 1
124. ANS: C PTS: 1
125. ANS: C PTS: 1
126. ANS: D PTS: 1

127.	ANS: A	PTS: 1
128.	ANS: B	PTS: 1
129.	ANS: B	PTS: 1
130.	ANS: B	PTS: 1
131.	ANS: B	PTS: 1
132.	ANS: D	PTS: 1
133.	ANS: A	PTS: 1
134.	ANS: D	PTS: 1
135.	ANS: A	PTS: 1
136.	ANS: B	PTS: 1
137.	ANS: C	PTS: 1
138.	ANS: A	PTS: 1
139.	ANS: D	PTS: 1
140.	ANS: C	PTS: 1
141.	ANS: C	PTS: 1
142.	ANS: C	PTS: 1
143.	ANS: D	PTS: 1
144.	ANS: A	PTS: 1
145.	ANS: D	PTS: 1
146.	ANS: B	PTS: 1
147.	ANS: C	PTS: 1
148.	ANS: D	PTS: 1
149.	ANS: C	PTS: 1
150.	ANS: B	PTS: 1