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POST TEST

For
Continuing Education Home Study Course:

PART 1: Digital Radiography an Introduction

(Covers Chapters 1-3)

4.5 Category A Continuing Education Credits

This course has been reviewed and approved by the
American Society of Radiologic Technologists (ASRT) and is accepted by ARRT.
It has been assigned 4.5 Category A Continuing Education Credit Hours.

COURSE OBJECTIVE:

The objective of this course is provide a comprehensive guide to all the major issues relating to digital imaging at a practical level.

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COURSE TITLE: PART 1: Digital Radiography an Introduction

PLEASE USE BLACK INK, NOT PENCIL

Course #: R076-1

AND USE CAPITAL LETTERS

J	O	H	N
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	A	B	C	D		A	B	C	D		A	B	C	D		A	B	C	D		A	B	C	D				
1.	O	O	O	O		27.	O	O	O	O		53.	O	O	O	O		79.	O	O	O	O		105.	O	O	O	O
2.	O	O	O	O		28.	O	O	O	O		54.	O	O	O	O		80.	O	O	O	O		106.	O	O	O	O
3.	O	O	O	O		29.	O	O	O	O		55.	O	O	O	O		81.	O	O	O	O		107.	O	O	O	O
4.	O	O	O	O		30.	O	O	O	O		56.	O	O	O	O		82.	O	O	O	O		108.	O	O	O	O
5.	O	O	O	O		31.	O	O	O	O		57.	O	O	O	O		83.	O	O	O	O		109.	O	O	O	O
6.	O	O	O	O		32.	O	O	O	O		58.	O	O	O	O		84.	O	O	O	O		110.	O	O	O	O
7.	O	O	O	O		33.	O	O	O	O		59.	O	O	O	O		85.	O	O	O	O		111.	O	O	O	O
8.	O	O	O	O		34.	O	O	O	O		60.	O	O	O	O		86.	O	O	O	O		112.	O	O	O	O
9.	O	O	O	O		35.	O	O	O	O		61.	O	O	O	O		87.	O	O	O	O		113.	O	O	O	O
10.	O	O	O	O		36.	O	O	O	O		62.	O	O	O	O		88.	O	O	O	O		114.	O	O	O	O
11.	O	O	O	O		37.	O	O	O	O		63.	O	O	O	O		89.	O	O	O	O		115.	O	O	O	O
12.	O	O	O	O		38.	O	O	O	O		64.	O	O	O	O		90.	O	O	O	O		116.	O	O	O	O
13.	O	O	O	O		39.	O	O	O	O		65.	O	O	O	O		91.	O	O	O	O		117.	O	O	O	O
14.	O	O	O	O		40.	O	O	O	O		66.	O	O	O	O		92.	O	O	O	O		118.	O	O	O	O
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17.	O	O	O	O		43.	O	O	O	O		69.	O	O	O	O		95.	O	O	O	O		121.	O	O	O	O
18.	O	O	O	O		44.	O	O	O	O		70.	O	O	O	O		96.	O	O	O	O		122.	O	O	O	O
19.	O	O	O	O		45.	O	O	O	O		71.	O	O	O	O		97.	O	O	O	O		123.	O	O	O	O
20.	O	O	O	O		46.	O	O	O	O		72.	O	O	O	O		98.	O	O	O	O		124.	O	O	O	O
21.	O	O	O	O		47.	O	O	O	O		73.	O	O	O	O		99.	O	O	O	O		125.	O	O	O	O
22.	O	O	O	O		48.	O	O	O	O		74.	O	O	O	O		100.	O	O	O	O		126.	O	O	O	O
23.	O	O	O	O		49.	O	O	O	O		75.	O	O	O	O		101.	O	O	O	O		127.	O	O	O	O
24.	O	O	O	O		50.	O	O	O	O		76.	O	O	O	O		102.	O	O	O	O		128.	O	O	O	O
25.	O	O	O	O		51.	O	O	O	O		77.	O	O	O	O		103.	O	O	O	O		129.	O	O	O	O
26.	O	O	O	O		52.	O	O	O	O		78.	O	O	O	O		104.	O	O	O	O		130.	O	O	O	O

TEST PART 1: DIGITAL RADIOGRAPHY an Introduction (Chapters 1 to 3 – 55 Questions)

1. W.C. Roentgen discovered X-rays in what year?
 - a. 1895
 - b. 1915
 - c. 1935
 - d. 1948
2. The film characteristic curve, also known as the Hurter-Driffield – or H and D – curve, can NOT be used to describe _____.
 - a. a film manufacturer
 - b. film contrast
 - c. film gamma
 - d. film speed
3. The _____ is NOT one of the 3 chief segments in an idealized characteristic curve for film-screen radiography.
 - a. toe
 - b. shoulder
 - c. slope
 - d. hip
4. Despite its limitations, film-screen radiography has continued to be popular over the years due to its _____.
 - a. consistently superior image quality regardless of initial radiation exposure accuracy
 - b. superior contrast resolution
 - c. flexible and unlimited optical range
 - d. superior spatial resolution
5. The FIRST step in image creation is collection of X-rays transmitted through a patient called _____.
 - a. data acquisition
 - b. data detection
 - c. data storage
 - d. data initiation
6. Which number system is used by computers?
 - a. decimal number system
 - b. binary number system
 - c. ternary number system
 - d. unary number system
7. Reducing storage space and _____ are the purpose of image compression.
 - a. increasing image quality
 - b. decreasing image transmission time
 - c. decreasing operator error
 - d. decreasing power requirements
8. _____ utilizes existing X-ray imaging equipment to produce digital images using photostimulable or storage phosphors.
 - a. Digital fluoroscopy
 - b. Computed radiography
 - c. Helical computed tomography
 - d. None of the above
9. X-rays are converted directly into _____ signals by detectors used in direct conversion digital radiography systems.
 - a. microwave
 - b. magnetic

- c. electrical
 - d. laser
10. Even when input exposure is high or low, a digital detector's _____ will produce acceptable images.
- a. narrow exposure latitude
 - b. wide exposure latitude
 - c. light optics
 - d. exposure enhancer
11. Fluoroscopy produces STATIC images.
- a. True
 - b. False
12. Which of the following is NOT part of a digital fluoroscopy imaging system?
- a. image intensifier tube
 - b. fluoroscopic X-ray tube
 - c. processing computer
 - d. linear array transducer
13. In a picture archiving and communications system (PACS), which of the following is/are MAJOR component(s)?
- a. display workstations
 - b. image acquisition devices
 - c. a PACS computer
 - d. all of the above
14. It is ESSENTIAL that confidential patient information and data in a picture archiving and communications system (PACS) be _____.
- a. transmitted
 - b. stored
 - c. processed
 - d. secured
15. _____ refers to the application of information technology to medical imaging.
- a. Medical imaging testing
 - b. Medical imaging quality assurance
 - c. Medical imaging informatics
 - d. Medical imaging assimilation
16. In digital image processing, patient data acquired during imaging is initially converted into a _____.
- a. numerical representation of the patient
 - b. a series of frequencies
 - c. a series of signals
 - d. radiographic code
17. Digital radiography detector output is _____.
- a. a digital signal
 - b. an analog signal
 - c. an analog image
 - d. a digital image
18. In a digital image, the location of every pixel can be identified using an X-Y coordinate system, where the X-axis specifies the _____ location of the pixel.
- a. horizontal
 - b. vertical
 - c. tangential
 - d. dimensional
19. _____ frequencies are produced by large structures.

- a. Low
 - b. Medium
 - c. High
 - d. Pulsed
20. _____ is the purpose of image restoration.
- a. Improvement in image quality
 - b. Reduction of image file size
 - c. Image recovery following deletion
 - d. Image recovery following archiving
21. The 2D (two-dimensional) array of numbers which comprise a digital image is called a _____.
- a. grid
 - b. ruler
 - c. matrix
 - d. voxel
22. Which of the following is NOT a digital image characteristic that could affect the digital image appearance?
- a. bit depth
 - b. pixel size
 - c. matrix size
 - d. ambient light
23. In digitizing an image, _____ is NOT one of the steps.
- a. scanning
 - b. sampling
 - c. quantization
 - d. hypothecation
24. Gray-scale processing does NOT include _____.
- a. image subtraction
 - b. temporal averaging
 - c. windowing
 - d. smoothing
25. When an image histogram is changed, the image _____ will change.
- a. brightness
 - b. matrix
 - c. size
 - d. contrast
26. When does a lookup table change the numbers assigned to input pixel values into output pixel values, thereby causing a change in image brightness and contrast?
- a. during digital image acquisition
 - b. during digital image processing
 - c. during digital image transmission
 - d. after digital image processing
27. In digital imaging, the window width refers to the _____.
- a. the amount of time allowed for image acquisition
 - b. the range of numbers in the image
 - c. the size of the monitor being used to view the image
 - d. the width of the software application window
28. In digital subtraction angiography, image subtraction and temporal averaging are routinely utilized.
- a. True
 - b. False

29. The objective of _____ is SMOOTHING an input image.
- high-pass filtering
 - low-pass filtering
 - geometric operation
 - windowing
30. Which digital image processing technique subtracts a blurred image from an original image to create a sharp image?
- sharp masking
 - unsharp masking
 - high-pass filtering
 - low-pass filtering
31. To enhance diagnosis, _____ result(s) in the sizing, scaling, rotation and translation of images.
- high-pass filtering
 - low-pass filtering
 - geometric operations
 - unsharp masking
32. Which of the following is one of the PRIMARY steps which make up the imaging process?
- Image display
 - image plate scanning and erasure
 - image acquisition
 - all of the above
33. PRE-processing of computed radiography image data does NOT do which of the following?
- pattern recognition
 - exposure field recognition
 - shading corrections
 - contrast enhancement
34. What type of exposure of a photostimulable phosphor imaging plate (PSP IP) results in a latent image?
- light exposure
 - magnetic exposure
 - x-ray exposure
 - sound wave exposure
35. For a latent image on a photostimulable storage phosphor imaging plate (PSP IP) to be rendered visible, it is scanned by _____.
- an x-ray beam
 - a magnetic beam
 - a laser beam
 - a light beam
36. The time period required for a latent image to disappear is known as _____.
- ghosting
 - fading
 - transitioning
 - waning
37. A computed radiography imaging plate is coated by front and back _____ layers.
- protective
 - support
 - electroconductive
 - phosphor
38. Which of the following is NOT a MAJOR component of a point-scan (PR) computed radiography (CR) reader?
- referencing magnet

- b. laser source
 - c. photodetector
 - d. imaging plate transport mechanism
39. _____ image acquisition principles are utilized by CONTEMPORARY computed radiography readers.
- a. Point-scan
 - b. Line-scan
 - c. Bit-scan
 - d. Pixel-scan
40. How is an imaging plate erased in the computed radiography reader?
- a. by exposing it to a series of contained, focused and powerful magnetic pulses
 - b. by exposing it to a sound wave burst at a manufacturer-specified frequency
 - c. by exposing it to a high intensity light brighter than the stimulating laser light
 - d. by a chemical wash
41. In computed radiography, _____ is one important PRE-processing operation.
- a. contrast enhancement
 - b. edge enhancement
 - c. pixel enhancement
 - d. exposure field recognition
42. In computed radiography, exposure recognition gives an indication as to the level of radiation falling upon the detector resulting from the exposure technique utilized.
- a. True
 - b. False
43. Which of the following is NOT a computed radiography POST-processing operation?
- a. dual-energy processing
 - b. spatial frequency enhancement
 - c. multi-scale, multi-frequency enhancement
 - d. grayscale rendition
44. In computed radiography contrast enhancement, a _____ is used to normalize and rescale pixel values.
- a. magnification tool
 - b. grid
 - c. lookup table
 - d. double exposure technique
45. Which of the following image processing operations joins together separate images to form a single image?
- a. multi-objective imaging
 - b. image subtraction
 - c. image composition
 - d. dynamic range control
46. Radiation exposure to the imaging plate in computed radiography is monitored through a numerical parameter known as the _____.
- a. exposure exponent
 - b. exposure indicator
 - c. exposure scale
 - d. range function
47. Which of the following relationships can be utilized to calculate pixel size?
- a. pixel size (PS) = field of view (FOV) / matrix size
 - b. pixel size (PS) = matrix size / field of view (FOV)
 - c. pixel size (PS) = matrix size / bit depth
 - d. pixel size (PS) = bit depth / field of view (FOV)

48. Which of the following dictates the level of quantum mottle, also known as quantum noise?
- the number of photons falling upon the detector to create the image
 - the number or electrons falling upon the detector to create the image
 - bit depth
 - the type of artifact involved
49. For a PERFECT digital detector, the detective quantum efficiency (DQE) is _____.
- zero
 - one
 - negative one
 - two
50. Imaging plates MUST be regularly cleaned to avoid _____.
- phosphor expansion
 - artifacts
 - radiation buildup
 - coating buildup
51. Object artifacts are associated with which of the following?
- ferromagnetic object(s) worn by the patient or housed in their body
 - patient movement(s) resulting in distortions in the image(s)
 - operator error(s) during imaging
 - latent image(s) from previous exposure(s)
52. When did the Joint Commission, previously the Joint Commission on the Accreditation of Healthcare Organizations, develop the notion of continuous quality improvement (CQI)?
- 1969
 - 1972
 - 1983
 - 1991
53. Continuing education, assessment of outcomes and quality assessment are part of _____.
- technical standards
 - quality control
 - quality assurance
 - appropriateness standards
54. Ensuring equipment meets a manufacturer's specifications is the FIRST major step in a quality control program and is known as _____.
- equipment initiation
 - acceptance testing
 - startup testing
 - tolerance ranging
55. Dark noise, spatial accuracy and erasure thoroughness are all computed radiography quality control tests recommended by which of the following?
- United States Nuclear Regulatory Commission (NRC)
 - United States Department of Health and Human Services (HHS)
 - American College of Radiology (ACR)
 - American Association of Physicists in Medicine (AAPM)