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Paper: Compute Radiography and  
Digital Radiography.

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Q1:

1

→ Digital Imaging has one of the best advantages that it has an ability to preprocess and postprocess the image, for the extracting more information.

1) Pre-Process:

→ It's usually for the purpose of improving image contrast.

→ It's largely Automatic

→ Preprocessing is designed to produce artifact-free digital images.

→ Preprocessing provides electronic calibration to reduce pixel-to-pixel, row-to-row, column-to-column response differences.

→ Averaging techniques also are <sup>(2)</sup> used to reduce Noise and Improve contrast.

→ The response of pixels surrounding the defective pixel is averaged, and that value is assigned to the defective pixel.

→ Each type of digital image receptor generates an electronic latent image that may not be made visible completely.

what remain is image lag, and this can be troublesome when one is switching from high-dose to low-dose techniques, such as switching from digital subtraction angiography to fluoroscopy. The solution is application of an offset voltage before the next image is acquired.

## ③ ⇒ Postprocessing:

- Postprocessing is where the digital imaging shines.
- Postprocessing refers to anything that can be done to a digital radiographic image after it's acquired by the imaging system.
- It required Manipulation.
- It's performed to optimize the appearance of image.
- Annotation is the process of adding text to an image.
- Has window & level adjustment.
- A large matrix size digital display devices have better spatial resolution

(4)

- Image flip: At times multiple digital images must be flipped horizontally or vertically.
- Subtraction of digital radiographic images obtain months apart — temporal subtraction — is used to amplify changes in Anatomy or disease. The purpose image subtraction is to enhance contrast.
- Edge enhancement is effective for fractures and small, high-contrast tissues.
- Highlighting,
  - ↳ Pan, scroll and zooming of an image.

Q2:

⇒ Spatial Resolution:

→ Spatial Resolution is the ability to image two separate objects and visually distinguish one from the other.

→ Spatial Resolution is the ability to image small structures that have high subject contrast such as bone-soft tissue interface.

⇒ Contrast Resolution:

→ Contrast Resolution is the ability to distinguish structures with similar subject contrast such as liver-spleen, fat muscle.

→ Computed Tomography and MRI have excellent contrast resolution. Conventional Radiography is fair to poor.

Q3:

Ans:

⑥

→ We need to reduce patient dose by 20% to 50%, depending on the examination.

→ However, quite the opposite often has occurred, called "Dose creep".

⇒ Dose Reduction with DR.

→ Because of Brightness and Contrast the exposure should not be repeated in DR.

→ DR can not compensate for heavy noise, caused by Quantum Mottle.

→ If high exposure is, then the image should not become a habit, even do not repeated.

Q4:

(7)

Feature of Active Matrix  
Liquid Crystal Display:

- In Active Matrix liquid-crystal display is a type of flat-panel display
- The only viable technology for high-resolution TVs, computer monitors, notebook computers, tablet computers and smart phone with a LCD screen.
- Due to low weight, very good image quality, wide color gamut and response time.



Q5:

Picture Archiving and  
Communication System.  
(PACS).

→ A picture archiving and communication system when fully implemented allows not only the acquisition but also the interpretation and storage of each medical image in digital form without hard copy.

→ The projected efficiencies of time and cost are enormous

→ PAs improves image interpretation processing, viewing storage and recall.

→ Principal components of a <sup>⑨</sup> PAS are the image acquisition System, display system, the Network and the storage System.

Q6: Types of Digital Radiographic Imaging Artifacts. (10)

1 → Processing Artifacts:

→ Manipulation of output image receptor may be necessary to correct for potential artifacts.

→ Single pixel or column will not interfere with diagnosis.

→ Flatfielding is a software correction that is performed to equalize the response of each pixel to uniform x-ray beam.

## 2): Software Artifacts: (ii)

→ Digital Radiographic images are obtained as raw data sets.

→ As such these images are ready "for processing".

## 3): Image Receptor Artifacts.

→ If CR IP has not been used for 24 hours, then it shouldn't be ~~er~~ erased again before use.

→ When completely erased, then image should be uniform.

Q7:

### Lossy Compression

- Removes non-useful part of data.
- Reduce the size of data at low extent
- Data quality degrades.
- Channel accommodates more data.

(12)

### Lossless Compression

- Reconstructs the exact data.
- Decrease the size of data to a great extent.
- Does not degrades.
- channel hold smaller amount of data.

### ⇒ Data Compression

- The process of reducing volume of data by applying a compression technique is called compression.
- And the resulting data is called compressed data.

(13)

Q 8:

→ For-processing images are manipulated into "For-presentation" images that the radiological technologist can use for QC and for interpretation by the radiologist.

→ The images of raw data sets are ready for processing.

(14)

Q9:

= Object Artifacts:

→ Object Artifacts can arise from:

→ Technologist error in patient positioning.

→ X-ray beam collimation.

→ Histogram selection.

→ Backscatter radiation also can be troublesome because of the sensitivity of the digital Radiographic image receptor.

→ Backscatter material can cause phantom image, if there are a lot of Backscatter material present behind the image receptor.

Due to Collimation and Partitions:

→ Exposure field recognition error may occur, if the exposure field is not properly collimated size and positioned.

→ Dark, ~~light~~ very light or Noisy image can be as a result.

→ Automatic field Radiation is <sup>(15)</sup> very important.

→ Patient radiation dose ~~and~~ reduction and improve image contrast in film needs a collimation of the x-ray beam.

→ Proper collimation and centering prevent histogram errors that can lead to artifacts.

⇒ Alignment:

→ If an image field and is not oriented size and dimensions of the IP, image artifacts can appear.