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|-----------------|------------|
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Notes

## Q NO 1

Ans

## Features of preprocessing.

⇒ It is the ability to manipulate ~~the~~ before the image display.

⇒ it improve contrast image.

= preprocessing of digital image is largely automatic

⇒ ~~Defective~~

**problem****Solution**

⇒ Defective pixel ⇒ interpolate adjacent pixel signal.

⇒ Image lag ⇒ offset correction

⇒ Line Noise ⇒ correct from dark reference zone

⇒ To produce free artifact digital image.

⇒ It is also reduce to pixel-to-pixel.

⇒ Column-to-column

⇒ row to row.

response

Notes

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⇒ Grain image are produced every few months

⇒ offset image are produced many time each day.

⇒ it is identified as flatfielding.

⇒ Some the technique do reduce noise ~~image~~ and improve contrast.

⇒ Defect are collected by signal interpolation, because million of pixel are present in display device but one ~~few~~ pixel can be responded.

⇒ the Digital image receptors produce latent image, but it is be visible completely.

⇒ Image lags, it can be troublesome when one switching is high does to low <sup>Notes</sup> does

## Technique

at this switching  
is also used  
angiography and Fluoroscopy.  
the solution is offset voltage.

- ⇒ line can be seen  
in drive of pixel
- ⇒ the line artifact can  
be occur in  
final image.
- ⇒ this is line noise.

## Feature of Postprocessing

- ⇒ postprocessing the  
image will be  
shine.
- ⇒ it is largely  
automatic.
- ⇒ postprocessing refer to  
anything that can form  
the digital image.
- ⇒ postprocessing of digital  
images requires the  
operator manipulation.

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it is used for  
better image zoom  
and detecting pathology.

⇒ Annotations:  
to add the text on  
image.

⇒ Window and level  
adjustment.  
⇒ it can visualize  
the shade of gray  
by human visualize system.

⇒ Magnification:  
⇒ is a area of  
on image to give or produce  
the smallest detail visible

⇒ it is also used  
for better spatial resolution

⇒ improve visualization  
and spatial resolution.

⇒ it must be flipped  
horizontally or vertically.

⇒ it is image flip.

- ⇒ Image version.  
 ⇒ when pathology present in body.  
 ⇒ the bone show black appearance  
 ⇒ and soft tissue show white.

- ⇒ this can be corrected of ~~zoo~~ by registration of image ~~zoo~~.  
 ⇒ the patient motion, it is the pixel shift.

- ⇒ the subtraction enhance the image contrast.

① NO 2

Ans Contrast resolution      Spatial Resolution

① Contrast resolution is variation occurs in both spatial resolution and speckle noise

① pixel size large spatial resolution will be poor.

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(2)

it distinguish shades - gray from black to white.

(3)

the it is also called dynamic region, because contrast resolution of gray scale.

(4)

Bone produce low contrast resolution and soft produce ~~with~~ high contrast resolution.

(5)

Digital System have superior contrast resolution

(2)

low contrast result ~~lower~~ lower spatial Resolution.

(3)

larger detector size produce poor spatial resolution.

(4)

the x-rays focal spot has influence of spatial resolution.

(5)

Digital System have inferior spatial resolution

# Q1404

## Features of liquid crystal:

- ⇒ A liquid crystal is a state that is in between the solid and liquid material.
- ⇒ Property of high molecular structure.
- ⇒ and also property in viscosity.
- ⇒ It is also linear organic molecules.
- ⇒ Many molecules dipole formed due to electric charge.
- ⇒ Liquid crystal display fashioned pixel by pixel.



(9)

⇒ it is very intense backlight.

⇒ the pixel contain ~~lighting~~ light polarizing filter and film

⇒ it control ~~intensity~~ intensity and color of light.

⇒ Flat panel digital device are identified by number of pixels.

⇒ Color LED have red green blue filter.

⇒ the principle system of viewing soft copy digital images

⇒ the characteristic of LCD affect image luminance.

⇒ Ambel. Ambel light is used. of great consideration. ~~an image~~

⇒ it is reduce ~~an~~ <sup>the</sup> image contrast.

⇒ Aperture factor is  
measure of Image  
luminance of LCD's.

⇒ Top Liquid Crystal display  
have better cycle!

⇒ Only 10% backlight is  
transmitted to the pixel

~~it~~ ..

Q No 5

Ans

picture Archiving and  
Communication System:

⇒ The picture archiving and  
communication system

⇒ it is fully implemented.

⇒ it is not only  
acquisition.

⇒ but it is also interpretation and storage of medical imaging

⇒ Picture archiving and communication system  
improve image interpretation, processing, viewing, storage, and recall.

## Network:

The workstation is the microprocessor controlled interact with each other in imaging system and control computer.

⇒ To provide interaction as a network is provided.

⇒ In radiology the network may consist of various types of device connected with each other.

Such as Storage  
retrieval, and viewing  
imaging.

- ⇒ PACS Workstation
- ⇒ Department infrastructure  
and hospital infrastructure

Client are interconnected  
by Cable Television,  
line among building  
by Satellite transmission  
to remote facilities.

⇒ Telemedicine is the process  
of transmission of  
viewing images.

⇒ The Network of  
Imaging System

⇒ Data is required.

⇒ Image reconstructed  
from data and processed  
at the console of  
Imaging System &  
transmitted to PACS

the ~~two~~ hospital departments workstation are ~~inter~~ interconnected with each other

⇒ Finally the completion of on examination, PACS allows for more efficient image archiving

# Storage System!

When image requirement and also the number of images file and other data

⇒ Image file size is the product of the matrix size and the gray scale bit depth.

Imaging Storage is very important in department.

⇒ When some open disc. gigabytes of data and images.

Notes

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When stored in Jukebox

⇒ The Dynamic range of DR and digital memory.

→ File storage is stretched.

⇒ Electronically image can be recalled zoom archival system to any workstation in second.

## Advantages:

- ① Hard Copy replacement
- ② Remote access
- ③ Electronic image integration platform
- ④ Radiology workflow management

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## QNO 6

First we discuss about  
Pedagogical artifacts,  
its effect on image  
quality.

At the development of  
DR as a new set  
artifact ~~produce~~ introduce,  
and therefore how to  
avoid them these  
artifacts.

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①

Improper Exposure

KV Artifacts

⇒ Some time the radiologist not set the exposure system for the patient.

⇒ the patient film would be Darkening or within whitening of image show.



⇒ So the exposure

Technique must be  
~~more~~ necessary ~~to~~  
 to the patient

⇒

When exposure are  
 proper setting but there  
 is no difficulty  
 occur on image

⇒ We avoid these artifact.  
 but the solution is  
 that when we used  
 proper exposure to  
 be used on  
 body part and  
 patient size.

## ② Light Bulb artifacts.

When light Bulb artifact  
 occur on image.

• because High exposure  
 or back scatter radiation  
 entering to imaging  
 plate from patient

due to increase in exposure for obese patient

⇒ due to uncollimated x-rays.

⇒ The Darkening of lower and on image portion of an image

⇒ the image show artifact,

⇒ if these artifacts are avoid them because of when use Reduce Collar

Scatter radiation when eye use lower kVp and proper collimation.

### ③ Double Exposure artifacts:

⇒ the double exposure artifacts occur

on image  
 ⇒ because of When  
 radiographers take  
 x-rays zoom patient  
 but if this  
 time ~~the~~ the ~~radiographer~~  
 radiographer takes  $\Phi$   
 Double or two x-ray in  
 same time in one  
 imaging plate in  
 different parts  
 of patient.

⇒ therefore the  $\Phi$  image  
 is not visible completely  
 ⇒ the artifacts show  
 on image.

⇒ The result is that  
 when we take ~~the~~  
 x-ray on patient

⇒ we know that the  
 one imaging plate  
 use for one x-ray film  
 and the other part  
 it used other imaging  
 plate.

⇒ and also know about proper  
 knowledge about x-ray equipment.

# Q NO 7

Ans

## Data Compression

Data Compression means when takes data

- it is Occure with exposure to the few x-ray beam.
- Data are just like in the form of images, and videos and file size etc.

### lossless

① Reduce the data file to 10% to 50% of its original value.

10% mean (10:1)  
50% 1/2 (2:1)

② it is not satisfied for large file image

### lossy

① 'Compress' factor upto 100:1 or greater can be use the image as fine detail required.

② Such as ~~video~~ video

Transmission time  
and data  
manipulation  
time still  
unacceptable

=> it is upto  
3:1 generally  
acceptable the  
digital radiographic  
image.

③ ~~At~~ it is  
also known as  
Reversible  
Compression

④ Data reduction  
is lower

⑤ Resultant file  
is not as  
small

⑥ use Text  
data file

teply the  
domestic Television,

=> it is greater  
then order of  
magnitude compression  
and less than  
10:1

Such as Support  
Compression  
as Dot CAD  
etc uncompressed,

② it is also  
known as  
Irreversible  
Compression

④ Data reduction  
is higher

⑤ Resultant file  
is smaller then  
original file.

⑥ used audio and  
Video and  
Images,

Ans

processing image

NO 8

presentation may

- |   |  |
|---|--|
| <p>① it is method to perform operation of an image</p>                        | <p>① the presentation allow to your story through visuals!</p>   |
| <p>② it is more informative.</p>  | <p>② if you choose photograph or other graphic design.</p>   |
| <p>③ it is the type of signal is in input image and output image</p>          | <p>③ the story would be compressed within image.</p>   |
| <p>④ Analysing and manipulation of the images</p>                             | <p>④ when you explain the image in our presentation image - the audience easily through the story.</p> |
| <p>⑤ important the image via image regulation tools</p>                       | <p>⑤ will you put high quality image and make good presentation</p>                                    |
| <p>⑥ Analogue image processing can be used for in hard copies printout of</p> | <p>⑥ your presentation image will enhance</p>  |

Q NO 3

Ans

## Characteristic of DR.

⇒ the characteristics of Digital radiography.

⇒ when this is effect on spatial resolution contrast resolution and a lower patient radiation dose and also image noise.

### ① Pixel:

A pixel is the smallest area in Digital image.

⇒ when pixel size is directly related to the amount of spatial resolution or detail in image.

For example pixel size  
too large spatial  
resolution will  
be poor

⇒ When ~~too~~ high KVP  
use lower patient  
dose.

⇒ no leakage occur-  
in tube.

⇒ The numb of  
bits with pixel  
is called as pixel  
bit depth.

②

### Matrix.

A Matrix is  
square of arrangement  
of number of column  
and rows in  
digital image.

⇒ Each box with this  
matrix  $\phi$  is  
specific location in  
an image.

⇒ the corresponding  
to ~~each~~ specific area



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of patient tissue.

⇒ ⇒ ~~lower~~ when proper  
to number of energy of  
x-rays produce  
this is no patient  
radiation occurs.

?

## Field of View:

The term field  
of view is x-ray  
field.

⇒ When ~~pat.~~ patient body  
part are included,  
in in image.

⇒ the larger the  
field of view larger  
will be images.

⇒ ~~with~~ there is no  
patient radiation occurs.

⇒ As a result the patient  
radiation occurs because  
the ~~the~~ leakage occurs  
in

⇒ In the high loop

low absorption

high transmission

low patient dose.

It is also  
vice versa,

⊙ No(9)

Ans

### Collimation!

When x-ray field exposure is not properly collimated

⇒ Such large size, position

⇒ When improper collimation

⇒ the image show

artifacts.

⇒ beam field of view and scatter radiation

⇒ Exposure through back of cassette

⇒ these all radiation as improper collimation can obscure image artifacts produce.

⇒ Best solution is that the proper knowledge about equipment and also accordance of cassette, size of collimation & position.

⇒ and body parts

⇒ proper collimation centering prevent and zoom histogram error. it can be leads to artifacts.

### Positioning:

if multiple field are projected on a single IP.

⇒ each must have clear.

Collimated edges and margins between each field as called as partitioning.

⇒ it is also called Double exposure artifacts

⇒ When ~~one~~ ~~more~~ two case more images are projected on a single IP.

⇒ Partitioning of multiple digital image on single IP ~~to~~ separation

⇒ proper ~~collimation~~ and collimation of each image.

⇒ When we ~~use~~ take two ~~the~~ X-ray in one imaging plate

⇒ as a result artifacts produce.

⇒ proper knowledge must be necessary. ✓  
the equipment.

### ③ Alignment

Alignment of the exposure field on the IP is important in the same way and some ~~tes~~ reason as collimation.

⇒ When an image field is not oriented with the size and dimension of the imaging plate the artifact must be appears.

⇒ Improperly collimated multiple fields not aligned when the imaging edge can result in overexposure and the artifacts can appears.

⇒ The collimation of X-ray tube not aligned the artifact must be produced.

Thank you Notes