

② X-Ray tube:

- electrical device used for the generation of x-ray.
- This is accomplished by the acceleration of electrons and then suddenly decelerating them.
- The energy of the x-ray is dependent on the kinetic energy of electron.

Function :-

Used for generation of x-rays.

③ Collimator:

A Collimator is a device that filter a stream of rays so that only those traveling through.

Function :-

- Collimator is used to ~~received~~ Allow signal of the the required area to rich the detector.
- It improve resolution of the image.

④ Filter:

Filter is a material placed in the front of an x-rays source in order to reduce intensity of x-ray beam.

Function:

it filter unwanted X-ray.

⑤ Grid:

is the part of an X-rays machine that filter out randomly deflected radiation that can obscure or blur an image produced by the machine.

Function:

- To absorb scatter radiation
- Improve the image quality.

⑥ Image Intensifier:

are used to convert low energy X-radiation into visible light.

Function:

it convert electron into visible light

Charge Coupled Device:

CCD is mounted on the output phosphor of the imaging intensifier tube. It is coupled through optic fiber. CCD is greater sensitivity to light.

Advantages:

it has lower level of electronic noise than television camera tube. It has greater sensitivity to light.

• Stable response to light.

• Flat Panel Image Receptor:

It is composed of CSI / a-Si panel.
FPIR is smaller lighter and
is intensified than image
intensifiers...

Function :-

it provides easy manipulation of
Patient Radiographs.
• No Caste required.

Flat Panel Image Display:

Flat panel display technology is
rapidly replacing the Cathode ray tube.
CRT in all applications.
Flat panel monitors are easier
to view and to manipulate the
provide better image.

Optical Coupling:

is a semiconductor
device, which is designed to
transfer electrical signal by using
light wave. in order to provide
coupling with electrical isolation
Circuits or systems.

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Q2 Four Prim Exposure Are:

① Kilovolt "Peak (Kvp)"

Kvp Controls Screen-Film radiographic Contrast.

beam penetrability.

The Kvp more effect on image receptor exposure. Kvp increase - more effect than any other less different differential absorption result in reduced image contrast.

②

Milliampers:-

- determine the MA selected the number of x-ray produced
- Controls radiographic density
- Controls quantity of x-rays production
- Control by adjusting the filament heat
- Quantity of exposure is directly proportional to mA.

EXPOSURE TIME

- Controls radiographic density
- Controls quantity of x-rays produced.
- Controls by adjusting the timer in x-ray circuit.

↳ Source-Image Receptor Distance (SID)
• Affect the density and intensity of the x-rays beam.

- Quantity and exposure in inverse square of the distance.

Each dimension of the radiation field is proportional to the SID therefore the field area is proportional to the square of SID.

End of Geusia-

QNO 3 .. ?

Ans

IMAGE QUALITY FACTOR:

Image quality factor refer to characteristics of including the radiographic image contrast. Optical (OD) image. These factor provide a mean for the radiologic technologist to procedure review and evaluate radiographic.

• Optical Density:-

Optical Density (OD) is the degree of blacking of the finished radiograph. OD has a numeric value and can be present is ranging degrees from completely black in which no light is transmitted through the radiographic.

• Image Contrast:-

The function in the image is to make anatomy more visible. Contrast is the difference in OD. b/w adjacent anatomical structures or the variation in OD on radiographic. Contrast therefore is perhaps the most important factor in radiographic quality.

IMAGE DETAIL :-

Image detail describes the sharpness of appearance of small structure on the radiograph with adequate detail even the smallest parts of the anatomy are visible and radiologist can more readily detect tissue abnormalities. Image must be evaluated by two means sharpness of image detail and visibility of image detail.

Distortion :-

The fourth image-quality factor is distortion, the mis-representation of object size and shape on the radiograph. Because of the position of the x-ray tube the anatomical part and the image receptor, the final image may misrepresent in object.

End of Question

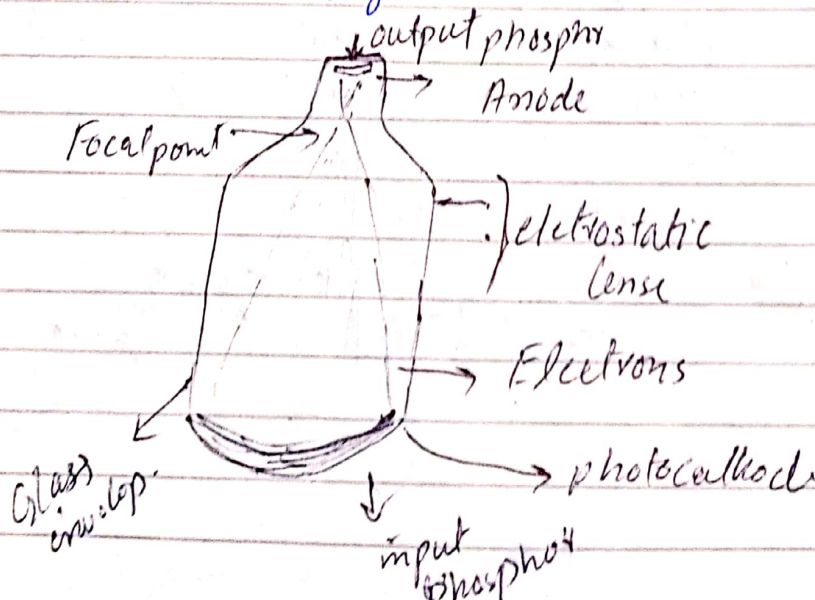
Q4 — ?

Ans) Image Intensifier Tube :-

The image intensifier tube is a complex electronic device that receives the image forming x-ray beam and converts it into a visible light image of high intensity. The tube components are contained within a glass or metal envelop that provides structural support - but more importantly maintain a vacuum.

When installed the tube is mounted inside a metal container to protect it from rough handling and breakage.

X-ray that exit the patient and are incident on the image intensifier tube are transmitted through the glass envelope and interact with the input phosphor which is Cesium iodide (CsI). When an x-ray interact with the input phosphor its energy is converted into visible light.



Q5 -
Part A

Ans Advantages of Flat Panel Image:-

- Distortion - Free image.
- Constant image quality over the entire image.
- Improved contrast resolution over the entire image.
- High DQE at all radiation dose levels.
- Rectangular image area coupled to similar image monitor.
- Unaffected by external magnetic fields.

Q5 Part(B)

Ans Charge Coupled Device:-

A major change from conventional fluoroscopy to DF is the use of a Charge Coupled device CCD instead of a TV camera tube. The demand of medical imaging are much more rigorous than these other applications that is why the application of the CCD in recent fluoroscopy is a development.

Advantage of CCD:

- In most applications such as a digital camera, in small size and ruggedness.
- Use for medical imaging.
- The spatial resolution of a CCD is determined by its physical size and pixel count.
- TV camera tube can show spatial distortion, "pin cushion" and "barrel" artifact.
- The CCD has greater sensitivity of light.
- The ~~result~~ are of noise than television camera tube.
- The result are higher signal to noise ratio (SNR) and better contrast.

End of paper.