

Date: _____

Day: M T W T F S S

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SUMMER FINAL PAPER G. RADIOLOGY

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Answer 02:

Four

Four Prime Exposure Factors.

1. Kilovolt Peak (kvp) :-

The kvp
are control Screen film
radiographic film Contrast.

Beam Penetrability:

The kvp has more
effect than any other
factor on image receptor
exposure.

Also kvp increases, less
differential absorption occurs.

Therefore, high kvp result
in reduced image contrast.

② Milliampere :

~~mA~~ mA Selected determines the number of x-rays produced and therefore the radiation quantity.

As more electrons flow through the x-ray tube, more x-rays are produced.

without contrast exposure time mA control the x-ray quantity and therefore the patient radiation dose.

x-ray quantity remain fixed with a change in mA.

Change in mA does not change the kinetic energy of electron flowing from cathode to anode.
It simply change the number of electrons.

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③ Exposure Time :-

The Radiographic Exposure Time usually are kept as short as possible.

The exposure is not to minimize patient radiation dose but rather to minimize motion blur that can occur because of patient motion.

Short exposure time reduces motion blur.

④ Distance :-

Distance have no effect on radiation quality.

Distance (SID) affects OD.

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Answer 01 :

Parts of Digital Fluoroscopy System

- ① Monitor
- ② Video Camera
- ③ Optical Coupling
- ④ Image Intensifier
- ⑤ Grid
- ⑥ Patient
- ⑦ Table
- ⑧ Filteration
- ⑨ Collimator
- ⑩ x-ray Tube
- ⑪ x-ray Generator

(5)

* Collimation :

In fluoroscopy, the collimation may be circular or rectangular in shape matching the shape of the image receptor.

* Monitor :

When performing diagnostics on digital x-ray exposure, users are increasingly reliant on large screens, which enable them to simultaneously call up image of different modalities. The monitors are designed just for that purpose and enable the display.

Optical Coupling:

The performance of x-ray imaging services

employing optical coupling between the x-ray detector.

Grids

Are placed between the patient and the x-ray film to reduce the scattered radiation reaching the detector. Reduced mainly by the Compton effect. And thus improve the image contrast.

Filteration:

Filters are metal sheets placed in the x-ray beam between the window and the patient that are used to attenuate the low energy.

x-ray Tube:

Special x-ray Tubes are generally found in such

⑦

System.

Answer 03 ::

Image Quality :-

The Quality of a medical image is determined by the imaging method, the characteristic of the equipment and the imaging variables selected by the operator. Image Quality is not a single factor but is a component composite of at least five factors.

(9)

Answer Q4 :-

Image Intensifier Components

An Image intensifier consists of the following major components an input window an input phosphor and Photocathode, several electrostatic focusing lenses, an accelerating anode an output phosphor screen and a protective vacuum case.

Answer (5) (11)

Advantages to using a Flat Panel Image receptor.

Flat-panel detectors are more sensitive and faster than film. Their sensitivity allows a lower dose of radiation for a given picture quality than film.

For fluoroscopy they are lighter, far more durable, smaller in volume, more accurate, and have much less image distortion than x-ray image intensifiers and can also be produced with larger areas.

Part B

Properties of charge coupled Device :-

CCD is an integrated circuit containing an array of linked, or coupled capacitors. under the control of an external circuit. each capacitor can transfer its electric charge to a neighboring capacitor. CCD sensors are a major technology used in digital imaging.

Uses :-

Charge-coupled-Devices CCD are used in many imaging applications. such as surveillance, hand held and Desktop Computer video Cameras

And Document Scanners. First CCDs have an input capacitance that varies over a range of 100 pF to 2000 pF and varies over range directly with the number of sensing elements.

~~THE
END~~