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Subject :

RST

PROGRAMM :

RADIOLOGY

SUBMITTED TO : SIR WAQAS IHSAN

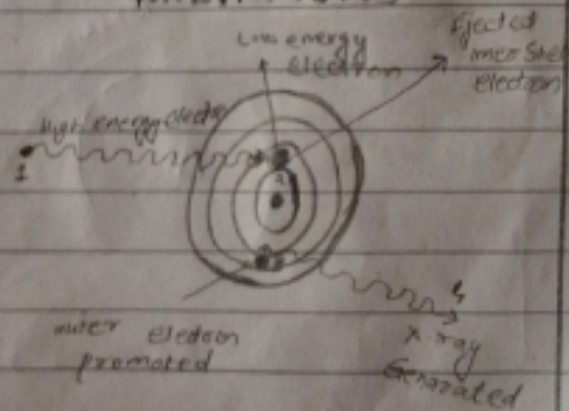
QNO: 01

ANS:

There are two types
of X-ray generated.

- (i) Characteristics radiations.
- (ii) bremsstrahlung radiations.

(a) CHARACTERISTICS RADIATIONS

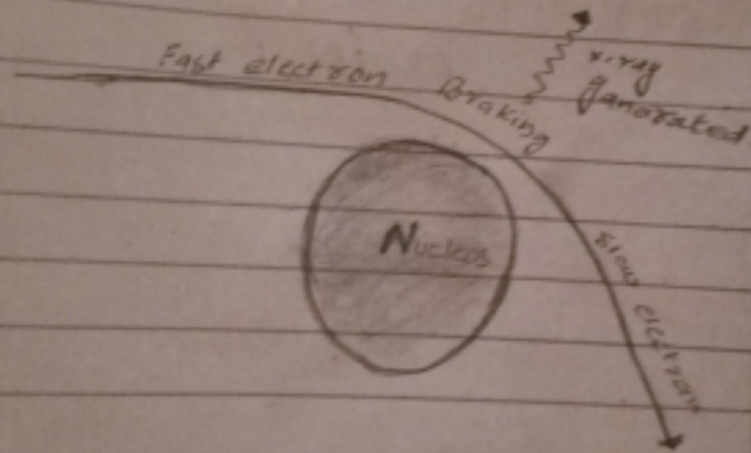


- When A high energy electron collides with an inner shell electron. both are ejected from the tungsten atom. leaving a "hole" in the inner layers.

2

This is filled by an outer shell electron with loss of energy emitted is an X-ray photon.

(b) BREMSSTRAHLUNG RADIATIONS.



When a electron passing near the nucleus it is slowed and its path is deflected. Energy loss is emitted as a bremsstrahlung X-ray photons.

- Bremsstrahlung = Braking - radiation
- Approximately 80% of the population of x-rays within the x-rays beam consist of x-rays generated in this way.

QNO: 03

ANS:

FACTORS THAT AFFECT X-RAYS QUANTITY

- kVp peak Voltage:
beam quantity is approximately proportional to the square of tube potential.
- Generator type: reducing ripple increases beam quantity.

→ Filtration: increasing
filtration reduce
beam quantity

→ Distance:
Invers Square
Law.

→ Current mA.:
beam quantity is
directly proportional to
to current.

→ Exposure time "Second":
beam quantity is
directly proportional
to exposure time.

→ ANOD MATERIALS:

Beam quantity is directly
proportional to Atomic
No. (Z) of The Anod
materials.

QNO: 03

QMS
FACTORS THAT EFFECT
THE SUBJECT CONTRAST.

(i) Thickness difference:

If the x-rays beam is attenuated by 2 different thickness of the same materials. The thicker part will be attenuate more x-ray than the thinner part.

(ii) Density difference

It is also known as the mass per unit volume. It is the most important factor contributing to the subject contrast. A higher density material will attenuate more x-rays than a lower density materials.

iii)

Atomic Number difference:

A high atomic number material will attenuate more than the lower atomic number materials.

iv)

KVP/ Radiation quality:

It has a great effect on subject contrast

A lower kVp will make

the x-ray beam less penetrating. This will result in a greater difference and attenuation between the different parts of subject leading to higher contrast.

A higher kVp will make

the x-ray beam more penetrating. This will result in less difference

in attenuation between

the different parts of

the subject leading to lower contrast.

QNO: 04

Q1 Definitions:

Q Collimator:

A collimator is a metallic barrier with an aperture in middle used to restrict the size of x-rays beam and volume of tissue irradiated.

Filteration:

To reduce the patient dose, the less penetration photon should be removed. This can be accomplished by placing a aluminium filter in the path of the beam.

iii)

Image Contrast:

Contrast is the difference in luminance or color that makes an object distinguishable. In visual perception of the real world.

contrast is determined by the difference in the color and brightness of the object and other object with in the same field view.

ii)

Aperture diaphragm:

In optics a diaphragm is a thin opaque structure with an opening (aperture) at its center the role of the diaphragm is to stop the passage of light except for the light passing through the aperture.

(4)
QNO: OS

ANS:

Compton Scattering:

Compton discovered
by Arthur Holly
Compton.

It is the scattering
of photon by a
charged particle usually
an electron.

It in result in
decreased energy
of the photon.

It is called the
Compton effect.

Part of the energy
of the photon is
transferred to
recoiling electron.

→ Compton scattering
occurs when a charged
particle transfer parts
of its energy to photons.

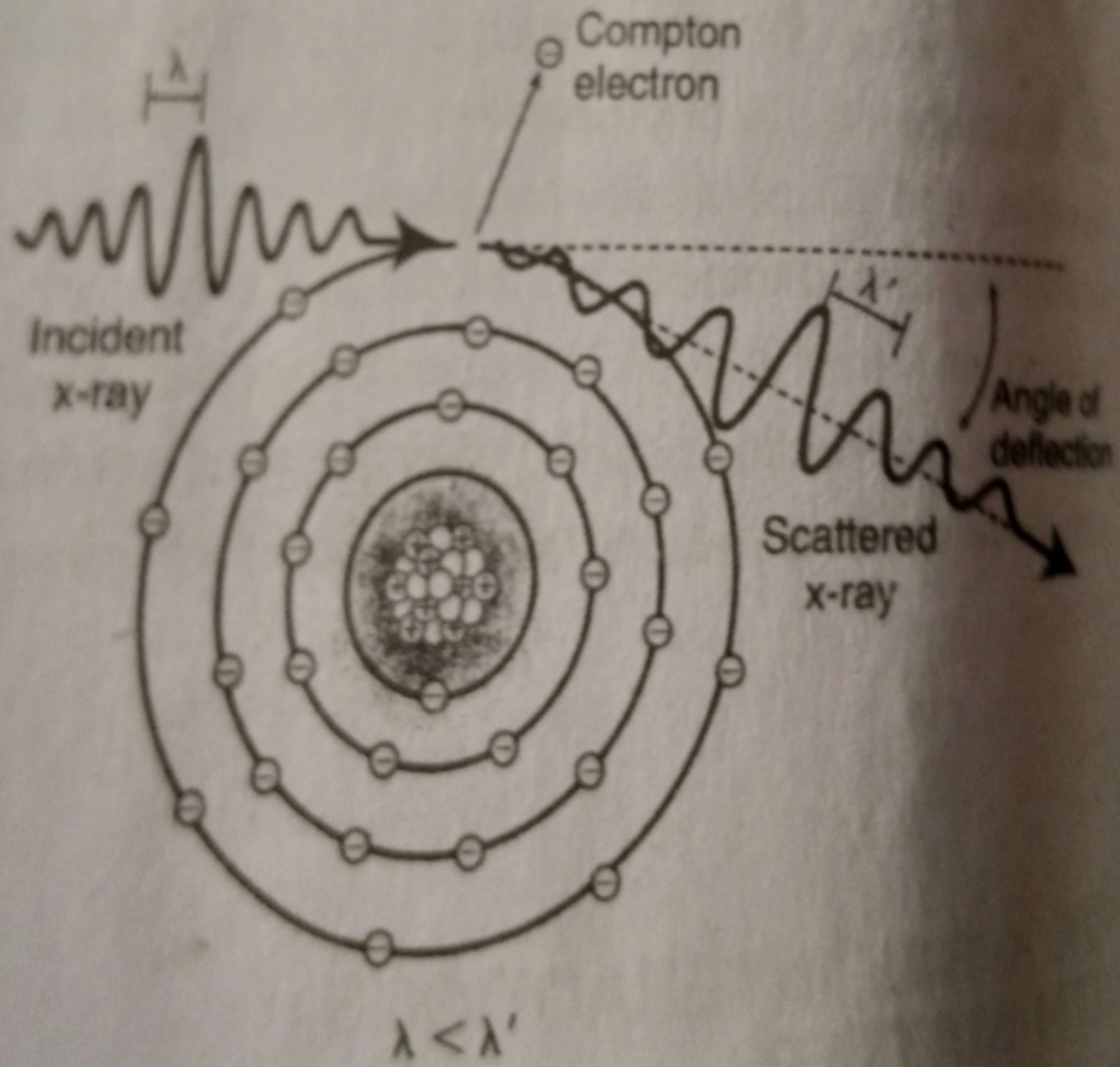


Photo electric effects.

→ phenomenon in which electrically charged particles are released from or within a material when it absorbs electromagnetic radiation.

The effect is often defined as the ejection of electrons from a metal plate when light falls on it.

