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Answer No = (1)

Ans

Stochastic effect:

:- Stochastic effect occurs by chance

Radiation exposure are the result of low doses and the doses delivered are a long period.

It consist of radiation induced malignancy and genetic effect. => life span shortening effect on local tissue

Assumed linear non-threshold dose relationship low and Law LET

They are chronic in nature because the delivered intermittently over the period.

It is particularly important

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It exhibit an increasing incidence of response \Rightarrow Not scalability with increasing dose.

- Non dose threshold has been established.

- Dose response relationship and linear.

EFFECT:

\Rightarrow Cancer

\Rightarrow Leukemia

\Rightarrow heredity effects.

Deterministic effect:

= It is also called non-stochastic effect

\Rightarrow it produce by high radiation dose

- increase the severity with increase radiation dose.

\Rightarrow Dose threshold and dose response relationship is non-linear

- Deterministic effect are immediate response

= Human response in a few days to a few weeks particularly not important.

Deterministic effect,

- Hair loss

\Rightarrow Skin injury. contact.

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Answer No = 2.

Radioactivity:

∴ Radioactivity is the spontaneous and energy emission of particles in order to become stable.

Some atoms can exist in an abnormally excited state characterised by an unstable nucleus to reach stability.

The nucleus spontaneously emits particles and energy and transforms itself into another atom. The atom involved in radioactivity is called a radionuclide.

Radioactivity decay results in emission of alpha particles, beta particles and usually gamma particles.

Radiation:

∴ It is the energy that comes from a source and travels through space such as light or heat or radio waves.

The emission of energy as electromagnetic waves or as moving subatomic particles.

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Particle especially high energy particles which cause ionization

Ionization radiation:

It is the type of radiation in that is capable of removing an orbital electron from an atom with which interact this type of radiation and matter is called ionization.

ionization occurs when x-ray passes close to an orbital electron of an atom and transfer sufficient energy to electron to remove it from in atom

The electron is a ~~ex~~ negative ion and remaining is positive ion.

ionization is the removal of an electron from an atom.

Harmful radiation:

Radiation damage the cells that make up the human body

⇒ low level radiation

are not dangerous

⇒ medium level cause sickness, headaches vomiting and fever

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→ high level damage internal
organ's
it difficult to treat high
radiation exposure.

Non-ionizing Radiation

Non-ionizing radiation refers
to any type of electro-
magnetic radiation that does
not carry enough energy
per quantum to ionize
atoms or molecule - that
is to completely remove an
electron from an
atom or molecule.

Answer No 3

Two basic principle of
radiation protection.

ALARA, CARDINAL principle

CARDINAL principle:

Time, distance, shielding.

Time

∴ Radiation exposure can be accumulated over the time of exposure

⇒ reduce the time for better image.

Distance:

∴ A greater distance from the radiation source can reduce radiation exposure

Shielding:

shielding must used.

⇒ such as caps, gloves etc

⇒ radiologist or physician protect from radiation.

ALARA:

∴ As low as reasonably achievable.

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Part B

Radiation protection:

- Radiation Protection apron.

=> Apron Accessories.

=> Radiation protection gloves should be used.

=> Thyroid shields

=> Protection Apron Buckles.

=> Radiation protection barriers or table shield.

=> Drape shield.

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Answer NC (M)

features of for protecting
radiation.

Many radiation protection devices and accessories are associated with modern x-ray imaging system.

• Protective x-ray tube housing.

Protective housing to reduce leakage radiation during using.

Control Panel:

∴ The control panel must indicate the condition of exposure and must positively indicate when x-ray tube is energized.

Some times visible or audible signals indicate when x-ray beam is energized.

Source-to-image distance

Indicator:

∴ A source to image distance indicator must be provided and can be simple type or attached

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to the tube housing or
advanced as lenses.
SID indicators must be indicated
within 2% of the indicated SID.

Collimation:-

Light localized, variable-aperture
rectangular collimated should be
provided.

X-ray beam and light field
must coincide within 2%
of SID.

Positive - Beam Limitation.

Automatic light localized,
variable aperture collimated
was required on all
imaging systems
united states 1974-1994

Beam Alignment:-

Each radiograph tube shall
be provided with a
mechanism to ensure proper
alignment of the X-ray beam
and the image receptor.

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Filtration:

Inherent plus added it
must be \rightarrow at least
2.5 mm above 70 kVp.

Reproducibility:

\therefore Constant
out-put radiation intensity
should be constant from
one exposure to another.
The variation in x-ray intensity
should not exceed 5%.

Linearity:

\therefore Constant out put
for a varied mA setting
while time is adjusted
to keep mAs the same

The maximum acceptable
variation is 5% from one
mA to adj. mA station.

Operator shield:

It must not be
possible to expose in a
room out side of the
operator booth.

Portable x-ray must have
> 2m tether for exposures.

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mobile x-ray imaging.

A protective system should assigned to mobile x-ray imaging system.

Answer (5)

What is Gm counter

Answer

Abbreviation:

GM = Geiger-muller counter.

invented by two physicist namely Geiger and muller 1928.

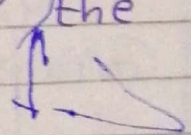
Definition:

∴ The GM counter is an electrical gas filled device which is used to detect type of ionizing radiation like alpha and beta particle, gamma rays.

neutron effect by using ionization which is produce in the Geiger Muller tube during this process.

Construction:

It is made up of a hollow cylinder which is filled with a gas at low pressure. The GM tube has a window at one end which is made up of mica. A voltage is used to connect at the end of the tube and to the electrode which is located right at the center of the tube.



Uses of GM. Counter as a radiation protective device:

The spread of discharge occurs throughout the detector and the plus height is get independent of the energy of the interacting particle primary ionization

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gas multiplication gets spread throughout the volume of Gm counter. Gas filled detectors can't be operated beyond the Gm region at the voltage due to discharging continuously.

The Gm counter is used for the detection of radio activity for a leak testing.

Gm counter is used for low level radiation mostly those area radiography treatment.

For precise and accurate measurement ionization chambers are required to one which are the used in Gm counter.

It have a long dead time about ranging from ten to hundred milliseconds.