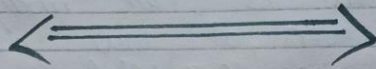


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QNO 1 :

Answer :

Deterministic effect :-

effect is also called ^{Deterministic} non-stochastic effect.

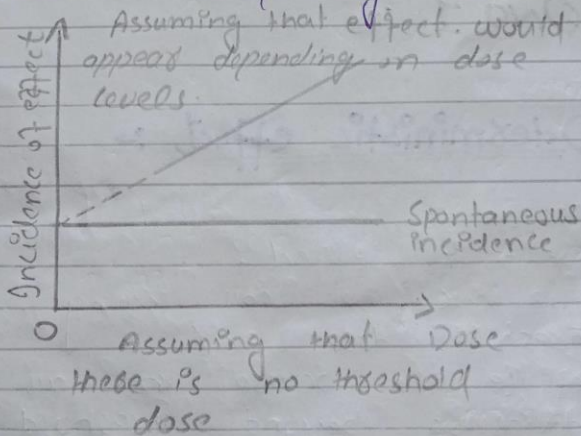
- => Occure due to cell killing
- => Threshold dose exist
- => Definite to occure in all individuals beyond threshold doses.
- => Severity of Symptoms increase with dose.
- => Mechanism is cell killing.
- => Deterministic in nature
- => Occurs only at high dose

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=> can be completely avoided.

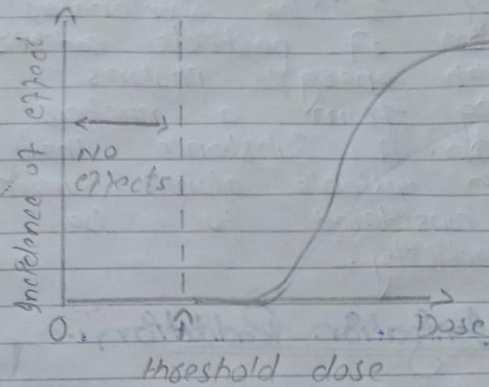
Stochastic effect =>

- => Occurs due to cell modification (mutation / chromosomal aberration)
- => No threshold dose
- => probabilistic in nature (occurs by chance in some individuals)
- => probabilistic / risk of chance increase with dose.
- => Mechanism is cell modification
- => Occurs even at low doses.
- => Cannot be completely avoided.



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Deterministic effect Diagram.



QNO 2 :-

Radiation :-

The radiation is the emission or transmission of energy in the form of waves or particles through space or through a material medium. This includes: electromagnetic radiation, such as radio waves, microwaves, visible light, x-rays and gamma radiation.

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Radioactivity :-

The radio-activity is the spontaneous emission of particle radiation or high energy photons resulting from a nuclear reaction. A substance that contain unstable atomic nuclei is considered to be radioactivity.

Non-Ionization Radiation :-

The non-ionization radiation refers to any type of a electromagnetic radiation that does not carry enough energy per quantum to ionize atom or molecule that is to completely remove an electron from an atom or molecule.

Ionizing Radiation :-

Ionizing radiation is a special type of radiation that include x-rays. Ionization radiation is any type of radiation that is capable of removing

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an orbital electron from the atom which is interact. this type of interaction between radiation and matter is called ionization.

Harmful Radiation ::

- => Radiation damage the cell that make up the human body.
- => low level radiation are not dangerous.
- => Medium level cause sickness, headaches and fever.

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Question (3)

part (A)

1) Time :- Reduction of time of exposure can directly reduce radiation exposure and reduce radiation dose. Exposure is a measure of the strength of a radiation field at some point in the air. Absorbed dose is the amount of the energy that ionizing radiation imparts to a given mass of matter.

2) Distance :- The distance between your body and the source of radiation exposure by a factor of 100 good use of the inverse-square law principle can significantly reduce radiation exposure for medical personnel and patients.

"~"~"~"~"

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Question (3)

part (B)

Radiation protection Names..

- 1) Radiation protection Aprons
- 2) Radiation protection Apron Accessories.
- 3) Radiation protection Gloves.
- 4) Radiation protection Glasses.
- 5) Radiation protection thyroid Shields.
- 6) Radiation protection Apron Racks.
- 7) Radiation protection Escape shields.
- 8) Radiation protection Barbies and Table Shields.



Question (4)

Ans

Radiographic protection Features..

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

protective x-ray tube Housing..

Every x-ray tube must be contained within a protective housing that

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reduces leakage radiation during use.

control panel

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

=> Beam ON must be clear to techs.

Source to Image receptor Distance Indicator

- => A source to image receptor distance (SID) indicator must be provided
- => The SID indicator must be accurate to within 2% as lasers.

positive beam limitation

- => Auto collimation circa 1974-1994
- => These PBL devices are no longer required but continue to be a part of new radiographic imaging system.
- => The PBL must be accurate to within 2% of the SID.

Beam Alignment :-

The radiographic tube should be provided with a mechanism to ensure proper alignment of the x-ray tube beam and the image receptor.

- ⇒ The x-ray beam of the image receptor is not also aligned.

Filtration :-

Inherent plus added.

- ⇒ Total must be at least 2.5mm above 70 kVp.

Reproducibility :-

The output radiation intensity should be constant from one exposure to another.

- ⇒ The variation in x-ray intensity should not exceed 5%.

Linearity :-

The output radiation intensity should remain constant when the exposure time remain constant.

- ⇒ The mAs to increase in proportion to the increase in mA.

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⇒ Max variation is 10% from one mA to adj. mA station.

Operation Shield ⇒

A must not be possible to expose an image receptor while the radiologic technologist outside a fixed protective barrier.

Mobile X-ray Imaging System.

The exposure switch of such an imaging system must allow the operator to remain at least 2 m from the x-ray tube during exposure.



Question (5)

What is GM counter ?

Answer:

Abbreviation :-

GM = Geiger - Mueller Counter.
Invented by : two physicist Mueller
and Hans Geiger in 1908.

Definition :-

The GM counter is an electrical gas filled device which is used to detect various type of ionizing radiation like alpha and beta particle which is produced in the geiger Mueller tube during the process.

Construction :-

The GM tube 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.

Use of GM counter as a radiation protection device :-

The spread of discharge occurs throughout the detector and the pulse height is get independent of the energy of the interacting particles primary ionization or we can say the primary ionizations.

- ⇒ Gas multiplication get spread throughout the volume of GM counter. Gas filled detector can't be operated beyond the GM region at the voltage due to discharge continuously.
- ⇒ GM meter are mostly used at the level of low radiation mostly of those areas whose radiotherapy treatment for public is situated.
- ⇒ For precise and accurate measurement are required ionization chambers are the one which are used instead of GM counters.
- ⇒ It have a long dead time of about ranging from ten to hundred of milliseconds.