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4th Semster

Paper :

Radiation Protection

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Q. No. Differentiate between deterministic and stochastic effects of Radiation?

Ans

Deterministic Effects

Stochastic Effects

(Hair loss, Cataract, Skin injury)

(Cancers, leukaemia, hereditary effects)

* (1) All whole body syndromes and partial effect with thresholds.

(1) eg. Cancers and hereditary (genetic) effects

* (2) Occur due to cell killing.

(2) Occur due to cell modification (mutation) chromosomal aberration.

* (3) Threshold dose exist.

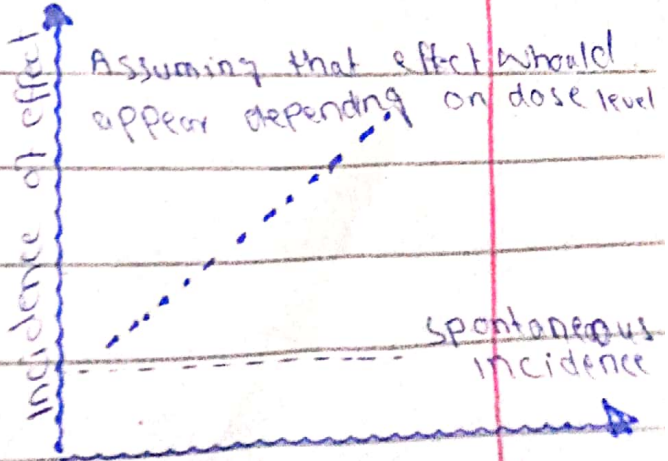
(3) No threshold dose

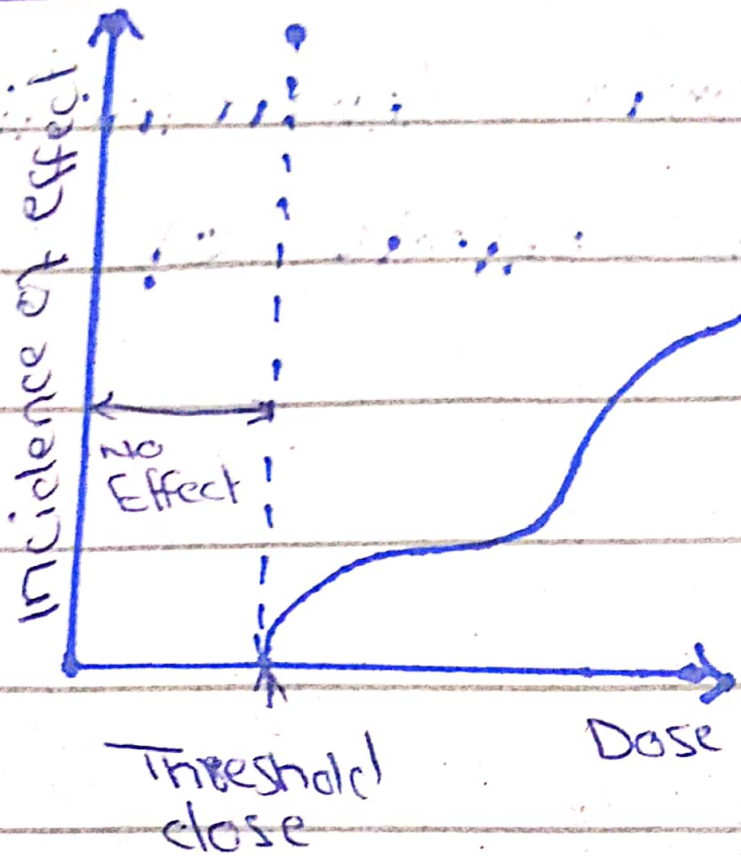
(4) Definite to occur in all individuals beyond threshold doses.

(4) Probabilistic in nature (occur in chance and some individuals)

(5) Severity of symptoms increase with dose

(5) Probabilistic or chance increase with dose.





Deterministic Effects

Q2) Explain briefly the following terms: Radiation, Radioactivity, Non-ionizing, ionizing, Harm Radiation.

(A) Radiation

=> In physics, Radiation is the emission or transmission of energy in the form waves or particles through space material. ~~includ~~
~~electromagnetic~~ radiation, Radio wave, microwave, ultraviolet, x-rays, gamma radiation.

Radioactivity

=> Radioactivity refers to the particles which are emitted from nuclei as a result of nuclear experiences intense conflict between ^{strongest} two forces nature. _B
Isotopes which are unstable and emit some kind of radiation.

Non-ionizing Radiation:

Non-ionizing Radiation refers to any type of electromagnetic radiation that does not carry enough energy per quantum to ionize atom or molecules.

Ionizing Radiations

energy released by atom in

The electromagnetic waves or particles.

People are exposed to source of natural source ionizing radiation.

Harm Radiation.

- Exposure high levels of radiation, such as being close to the atomic blast; acute radiation, (radiation sickness) it result in long term health effects such as cancer and cardiovascular disease.

Q3) (a) Write two basic
Principle. Radiation protection.

Ans Principle of Radiation
Protection

International Commission on
Radiological Protection (ICRP)

Justification

• Any decision in
that alters the radiation exposure
situation should be do more
than
good than harm.

Dose Limitation

• The total
dose to any individual should
not exceed the appropriate limits.

(b) Write down the names of the
radiation protection device.

Ans ALARA

(As low as reasonably
achievable)

Cardinal Principle

(1) Time

(2) Distance

(3) Shielding

(1) Time

Radiation exposure can be accumulated over time exposure in C-arm fluoroscopy guided interventions. Checking the C-arm fluoroscopy is related to the radiation exposure.

Distance

A greater distance from radiation source, can reduce radiation exposure.

Shielding

There are many shielding devices such as caps, leads, glasses, thyroid protectors.

- ° Always collimate to the smallest field size.

Q 4 What are features for radiation protection design? Explain briefly.

Ans Radiation Protection design. Design of equipment incorporates features that minimize the spread of radioactivity during maintenance operations. These features include flush and draining flushing the connection on pumps casing for draining and maintenance and connection on piping system that could come highly radioactivity.

Q.5) What is GM Counter, how it can be used as a radiation protection device.

GM Counter:

As device used for the detection and measurement of all type of radiation.

⇒ many radiation protection device and accessories are associated with a modern radiology service.

Two common machine key machine are.

- Protection Tube Housing
- The Control Panel.

• many safety feature are designed into the modern equipment.