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Radiation Physicist Job Interview Preparation Guide.

Question #1

Tell us what would your next step be if a senior member of your team disagreed with your judgment on a patient's radiation therapy?

Answer:

Shows interpersonal skills and the ability to work and collaborate with others.

Read More Answers.

Question # 2

Explain me what is absorbed dose?

Answer:-

Absorbed dose (Animation) the amount of energy deposited by ionizing radiation in a unit mass of tissue. It is expressed in units of joule per kilogram (J/kg), and called "Gray" (Gy).

Read More Answers.

Question #3

What is air kerma?

Answer:-

Air kerma the initial kinetic energy of the primary ionizing particles (photoelectrons, Compton electrons, positron/negatron pairs from photon radiation, and scattered nuclei from fast neutrons) produced by the interaction of the incident uncharged radiation in a small volume of air, when it is irradiated by an x-ray beam. Unit of measure is Gray.

Read More Answers.

Question # 4

What is beta particles?

Answer:-

Beta particles (Animation) (Image) electrons ejected from the nucleus of a decaying atom. Although they can be stopped by a thin sheet of aluminum, beta particles can penetrate the dead skin layer, potentially causing burns. They can pose a serious direct or external radiation threat and can be lethal depending on the amount received. They also pose a serious internal radiation threat if beta-emitting atoms are ingested or inhaled.

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Question # 5

What is contamination, fixed?

Answer-

Contamination, Fixed skin contamination is that which remains after bathing or attempted decontamination. Contamination is assumed to be removed by natural processes within 336 hours (14 days) after deposition on the skin.

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Question # 6

What is deterministic effect?

Answer:-

Deterministic effect an effect that can be related directly to the radiation dose received. The severity increases as the dose increases. A deterministic effect typically has a threshold below which the effect will not occur.

Read More Answers.

Question #7

What is external irradiation (or external exposure)?



Answer:-

External irradiation occurs when all or part of the body is exposed to penetrating radiation from an external source. During exposure, this radiation can be absorbed by the body or it can pass completely through. A similar thing occurs during an ordinary chest x-ray. Following external exposure, an individual is not radioactive and can be treated like any other patient. Gamma or photon radiation exposure from a terrorist nuclear event or radiation dispersal device would make the victim at risk for Acute Radiation Syndrome, depending on the dose received.

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Question #8

What is gray (Gy)?

Answer-

The new international system (SI) unit of radiation dose, expressed as absorbed energy per unit mass of tissue. The SI unit "Gray" has replaced the older "rad" designation. (1 Gy = 1 joule/kilogram = 100 rad). Gray can be used for any type of radiation (e.g., alpha, beta, neutron, gamma), but it does not describe the biological effects of different radiations. Biological effects of radiation are measured in units of "Sievert" (or the older designation "rem"). Sievert is calculated as follows: Gray multiplied by the "radiation weighting factor" (also known as the "quality factor") associated with a specific type of radiation.

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Question #9

What is low-level waste (LLW)?

Answer:-

Low-level waste (LLW) radioactively contaminated industrial or research waste, such as paper, rags, plastic bags, medical waste, and water-treatment residues. It is waste that does not meet the criteria for any of three other categories of radioactive waste: spent nuclear fuel and high-level radioactive waste; transuranic radioactive waste; or uranium mill tailings. Its categorization does not depend on the level of radioactivity it contains.

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Question # 10

What is fallout, nuclear?

Answer:-

Fallout, nuclear minute particles of radioactive debris that descend slowly from the atmosphere after a nuclear explosion. For more information

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Question # 11

What is effective dose?

Answer:-

Effective dose is a calculated quantity developed by the ICRP (1991) for purposes of radiation protection. The effective dose is assumed to be related to the risk of a radiation-induced cancer or a severe hereditary effect. It takes into account: the absorbed doses that will be delivered to the separate organs or tissues of the body during the lifetime of an individual due to intakes of radioactive materials; the absorbed doses due to irradiation by external sources; the relative effectiveness of different radiation types in inducing cancers or severe hereditary effects; the susceptibility of individual organs to develop a radiation-related cancer or severe hereditary effect; considerations of the relative importance of fatal and non-fatal effects; and, the average years of life lost from a fatal health effect. (HPS 005-3) Thus, the effective dose is a quantity calculated by multiplying the equivalent dose received by every significantly irradiated tissue in the body by a respective tissue weighting factor (this factor reflects the risk of radiation-induced cancer to that tissue) and summing together the individual tissue results to obtain the effective dose. Such a dose, in theory, carries with it the same risk of cancer as would an equal equivalent dose delivered uniformly to the whole body.

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Question # 12

What is dirty bomb?

Answer:-

Dirty bomb is a device designed to spread radioactive material by conventional explosives when the bomb explodes. A dirty bomb kills or injures people through the initial blast of the conventional explosive and spreads radioactive contamination over possibly a large area-hence the term "dirty." Such bombs could be miniature devices or large truck bombs. A dirty bomb is much simpler to make than a true nuclear weapon.

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Question # 13

What is coulomb?

Answer:-

Coulomb the international system (SI) unit of electric charge. A coulomb is the quantity of charge passing a cross section of conductor in one second when the current is one ampere.

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Question # 14

What is chain reaction?

Answer:

Chain reaction a process that initiates its own repetition. In a fission chain reaction, a fissile nucleus absorbs a neutron and fissions (splits) spontaneously, releasing additional neutrons. These, in turn, can be absorbed by other fissile nuclei, releasing still more neutrons. A fission chain reaction is self-sustaining when the number of neutrons released in a given time equals or exceeds the number of neutrons lost by absorption in non-fissile material or by escape from the system.

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Question # 15

What is becquerel (Bq)?

Answer-

Becquerel (Bq) (Animation) the amount of a radioactive material that will undergo one decay (disintegration) per second. For more information

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Question # 16

What is acute exposure?

Answer:-

Acute exposure an exposure to radiation that occurred in a matter of minutes rather than in longer, continuing exposure over a period of time.

Read More Answers.

Question #17

What is absolute risk?

Answer:-

Absolute risk the proportion of a population expected to get a disease over a specified time period.

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Question # 18

What is air burst?

Answer:-

Air burst a nuclear weapon explosion that is high enough in the air to keep the fireball from touching the ground. Because the fireball does not reach the ground and does not pick up any surface material, the radioactivity in the fallout from an air burst is relatively insignificant compared with a surface burst.

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Question #19

What is cobalt (Co)?

Answer:-

Cobalt (Co) a gray, hard, magnetic, and somewhat malleable metal. Cobalt is relatively rare and generally obtained as a byproduct of the production of other metals, such as copper. Its most common radioisotope, cobalt-60 (Co-60), is used in radiography and medical applications. Co-60 emits beta particles and gamma rays during radioactive decay.

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Question # 20

What is decay products (or daughter products)?

Answer:

Decay products (or daughter products) are the isotopes or elements formed and the particles and high-energy electromagnetic radiation emitted by the nuclei of radionuclides during radioactive decay. Also known as "decay chain products" or "progeny" (the isotopes and elements). A decay product may be either radioactive or stable.

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Question # 21

What is emergency Planning Zone (EPZ)?

Answer:-

Emergency Planning Zone (EPZ) is the area surrounding a nuclear power plant for which plans required by the NRC have been made in advance to ensure that prompt and effective actions are taken to protect the health and safety of the public in case of an incident. There is a plume exposure pathway EPZ which extends about 10 miles in radius around a plant. Its primary concern is the exposure of the public to, and the inhalation of, airborne radioactive contamination. The ingestion pathway EPZ extends about 50 miles in radius around a plant. Its primary concern is the ingestion of food and liquid that is contaminated by radioactivity.

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Question # 22

What is high-level radioactive waste?

Answer:-

High-level radioactive waste: the radioactive material resulting from spent nuclear fuel reprocessing. This can include liquid waste directly produced in reprocessing or any solid material derived from the liquid waste having a sufficient concentration of fission. Other radioactive materials can be designated as high-level waste if they require permanent isolation. This determination is made by the U.S. Nuclear Regulatory Commission on the basis of criteria established in U.S. law.

Read More Answers.

Question # 23

Explain me how do you, along with your team, determine which radiation treatments are best for your patients?

Answer:

Demonstrates a patient-centered approach to developing treatment plans.



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Question # 24

Explain me what is alpha particle?

Answer:-

Alpha particle (Animation) the nucleus of a helium atom, made up of two neutrons and two protons with a charge of +2. Certain radioactive nuclei emit alpha particles. Alpha particles generally carry more energy than gamma rays or beta particles, and deposit that energy very quickly while passing through tissue. Alpha particles can be stopped by a thin layer of light material, such as a sheet of paper, and cannot penetrate the outer, dead layer of skin (Illustration). Therefore, they do not damage living tissue when outside the body. When alpha-emitting atoms are inhaled or swallowed, however, they are especially damaging because they transfer relatively large amounts of ionizing energy to living cells.

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Question # 25

What is cesium-137 (Cs-137)?

Answer:-

Cesium-137 (Cs-137) has a half-life of 30.17 years and decays by beta and gamma radiation. Cs-137 is produced by nuclear fission for use in medical devices and gauges and is one of the byproducts of nuclear fission processes in nuclear reactors and nuclear weapons testing. Small quantities of Cs-137 can be found in the environment from nuclear weapons tests that occurred in the 1950s and 1960s and from nuclear reactor accidents, such as the Chernobyl power plant accident in 1986, which distributed Cs-137 to many countries in Europe. (HHS/CDC)

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Question # 26

What is decay chain (decay series)?

Answer:-

Decay chain (decay series) is the series of decays that certain radioisotopes go through before reaching a stable form. For example, the decay chain that begins with uranium-238 (U-238) ends in lead-206 (Pb-206) after forming isotopes, such as uranium-234 (U-234), thorium-230 (Th-230), radium-226 (Ra-226), and radon-222 (Rn-222).

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Question # 27

What is first receiver?

Answer:-

Healthcare workers in a hospital or other facility where victims arrive for treatment. First receivers provide medical care at locations remote from the incident and not at the site of a hazardous materials release. Since victims may arrive for treatment still contaminated with hazardous materials, first receivers must also protect themselves by putting on appropriate PPE before delivering medical care.

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Question # 28

What is immediately Dangerous to Life or Health (IDLH)?

Answer:

A level of exposure to airborne contaminants likely to cause death; immediate or delayed permanent adverse health effects; or prevent escape from such an environment. IDLH values are considered a maximum level above which only a highly reliable breathing apparatus providing maximum worker protection is permitted.

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Question # 29

What is non-ionizing radiation?

Answer:-

Non-ionizing radiation: radiation that has lower energy levels and longer wavelengths than ionizing radiation. It is not strong enough to affect the structure of atoms it contacts but is strong enough to heat tissue and can cause harmful biological effects. Examples include radio waves, microwaves, visible light, and infrared from a heat lamp.

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Question # 30

What is geiger counter?

Answer:-

A radiation detection and measuring instrument consisting of a gas-filled tube containing electrodes, between which an electrical voltage but no current flows. When ionizing radiation passes through the tube, a short, intense pulse of current passes from the negative electrode to the positive electrode and is measured or counted. The number of pulses per second measures the intensity of the radiation field. Geiger counters are the most commonly used portable radiation detection instruments.

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Question # 31

What is dose reconstruction?

Answer:-



Dose reconstruction scientific procedures that assist with 4 activities - managing victims of radiation emergencies, such as providing input to decisions on protection of emergency workers and members of the public or medical treatment of exposed individuals; providing exposed individuals or populations with information about the doses they received; investigating dose-response relationships in epidemiologic studies; determining whether individuals whose disease might have been induced by radiation qualify for compensation.

Read More Answers.

Question #32

Tell me how do you explain the radiation treatment process to patients and ensure they know what to expect?

Answer-

Tests communication and patient-management skills.

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Question #33

What is Acute Radiation Syndrome (ARS)?

Answer:-

Acute Radiation Syndrome (ARS) The Acute Radiation Syndrome (ARS) is also known as Radiation Sickness. A person exposed to radiation will develop ARS only if the radiation dose was high, penetrating (e.g., x-rays or gamma rays), encompassed most or all of the body, and was received in a short period of time. Clinical severity of the four subsyndromes of ARS (hematopoietic, cutaneous, gastrointestinal, and neurovascular) will vary with dose and host factors (e.g., young or old age, immunosuppression, and medical co-morbidity--especially extensive trauma and burns).

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Question # 34

What is committed dose equivalent (CDE)?

Answer.

Committed dose equivalent (CDE) The dose to a specific organ or tissue that is received from an intake of radioactive material by an individual over a specified time after the intake. For radiation protection purposes, the specified time is to the age of 70, which is normally taken to be 50 years for a radiation worker and 70 years for a member of the public.

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Question # 35

What is gamma rays?

Answer:-

high-energy electromagnetic radiation emitted by certain radionuclides when their nuclei transition from a higher to a lower energy state. These rays have high energy and a short wave-length. All gamma rays emitted from a given isotope have the same energy, a characteristic that enables scientists to identify which gamma emitters are present in a sample. Gamma rays penetrate tissue farther than do beta or alpha particles but leave a lower concentration of ions in their path to potentially cause cell damage. Gamma rays are very similar to x-rays.

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Question # 36

What is incident (unplanned event)?

Answer:-

An occurrence or event, natural or manmade that requires a response to protect life or property. Incidents can include major disasters, emergencies, terrorist attacks, terrorist threats, civil unrest, wild land and urban fires, floods, hazardous materials spills, nuclear accidents, aircraft accidents, earthquakes, hurricanes, tornadoes, tropical storms, tsunamis, war-related disasters, public health and medical emergencies, and other occurrences requiring an emergency response.

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Question #37

Suppose a patient is overwhelmed and upset by the lack of progress they are showing. How do you handle the situation?

Answer:

Illustrates whether the individual has a competent bedside manner and if they can handle highly emotional situations without becoming flustered.

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Question # 38

What is cumulative dose?

Answer:-

Cumulative dose the total dose resulting from repeated or continuous exposures of the same portion of the body, or of the whole body, to ionizing radiation.

Read More Answers.

Question #39

What is electromagnetic radiation?

Answer.

A traveling wave motion that results from changing electric and magnetic fields. Types of electromagnetic radiation range from those of short wavelength, like x-rays and gamma rays, through the ultraviolet, visible, and infrared regions, to radar and radio waves of relatively long wavelengths.



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Question # 40

What is lead federal agency (LFA)?

Answer:

Lead federal agency (LFA) the federal agency that leads and coordinates the emergency response activities of other federal agencies during a nuclear emergency. After a nuclear emergency, the Federal Radiological Emergency Response Plan

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Question # 41

Tell us how do you stay up to date with new radiation treatments?

Answer:-

Shows continuous training and professional development.

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Question # 42

What is beta burns?

Answer:-

Beta burns Energetic beta particles with high enough specific-activity, if left on the skin surface for a sufficient length of time, may cause erythema and dry (or even wet) desquamation. These are often called "beta burns." "Beta burns" have been described after a nuclear weapon detonation as a consequence of fallout on the skin.

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Question #43

What is effective half-life?

Answer:-

Effective half-life the time required for the amount of a radionuclide deposited in a living organism to be diminished by 50% as a result of the combined action of radioactive decay and biological elimination.

Read More Answers.

Question # 44

What is leukocyte reduction?

Answer:

Leukocyte reduction a process used to filter and remove white blood cells from whole blood before transfusion. Leukocytes are removed from blood because they provide no benefit to the recipient but may carry bacteria and viruses to the recipient. Patients who receive blood that has not been leuko-reduced may have adverse effects, including fever with chills; alloimmunization, an immune system reaction that can compromise a later transfusion; and the transmission of viruses, including cytomegalovirus, which can be dangerous for low-birth weight infants and to immunosuppressed patients.

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Question # 45

What is high-Efficiency Particulate Air Filter (HEPA)?

Anewor.

High-Efficiency Particulate Air Filter (HEPA) a filter that is at least 99.97% efficient in removing monodisperse particles of 0.3 micrometers in diameter. The equivalent NIOSH 42 CFR 84 particulate filters are the N100, R100, and P100 filters.

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Question # 46

What is actinides?

Answer:-

Actinides elements in the periodic table with atomic numbers from 90 to 103 (thorium to lawrencium); i.e., elements with a higher atomic number than actinium, which has an atomic number of 89. These are also called "rare earth metals." They include most of the well-known elements found in nuclear reactions. Actinides with atomic numbers higher than 92 do not occur naturally but are produced artificially by bombarding other elements with particles. Some of the actinides include plutonium, curium, and californium.

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Question # 47

What is Biological Effects of Ionizing Radiation (BEIR) Reports?

Answer:

Biological Effects of Ionizing Radiation (BEIR) Reports of the National Research Council's committee on the Biological Effects of Ionizing Radiation. For more information

Read More Answers.

Question # 48

What is health physics?



Answer:-

Health physics a scientific field that focuses on protection of humans and the environment from radiation. Health physics uses physics, biology, chemistry, statistics, and electronic instrumentation to help protect individuals from any damaging effects of radiation.

Read More Answers.

Question # 49

What is Cutaneous Radiation Syndrome (CRS)?

Answer:-

Cutaneous Radiation Syndrome (CRS) the complex syndrome resulting from radiation exposure of more than 200 rads to the skin. The immediate effects can be reddening and swelling of the exposed area (like a severe burn), blisters, ulcers on the skin, hair loss, and severe pain. Very large doses can result in permanent hair loss, scarring, altered skin color, deterioration of the affected body part, and death of the affected tissue (requiring surgery).

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Question #50

What is activity (radioactivity)?

Answer:-

Activity (radioactivity) the property of certain nuclides of emitting radiation by spontaneous transformation of their nuclei. Various units of (radio)activity have been used including curie (1 $Ci = 3.7 \times 1010$ disintegrations per second) and becquerel

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Question # 51

What is combined injury?

Answer:-

Combined injury physical, thermal, and/or chemical trauma combined with radiation exposure at a dose sufficient to diminish the likelihood of overall survival or functional recovery.

Read More Answers

Question # 52

What is kerma?

Answer:-

Kerma is the initial kinetic energy of the primary ionizing particles (photoelectrons, Compton electrons, positron/negatron pairs from photon radiation, and scattered nuclei from fast neutrons) produced by the interaction of the incident uncharged radiation, per unit mass of interacting medium. Unit of measure is gray.

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Question # 53

Please explain what is biological half-life?

Answer:

Biological half-life the time required for one half of the amount of a substance, such as a radionuclide, to be expelled from the body by natural metabolic processes, not counting radioactive decay, once it has been taken in through inhalation, ingestion, or absorption.

Read More Answers.

Question #54

What is americium (Am)?

Answer-

Americium (Am) a silvery metal; it is a man-made element whose isotopes Am-237 through Am-246 are radioactive. Am-241 is formed spontaneously by the beta decay of plutonium-241. Trace quantities of americium are widely used in smoke detectors and as neutron sources in neutron moisture gauges.

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Question #55

What is deuterium?

Answer:

Deuterium a non-radioactive isotope of the hydrogen atom that contains a neutron in its nucleus in addition to the one proton normally seen in hydrogen. A deuterium atom is twice as heavy as normal hydrogen.

Read More Answers.

Question # 56

What is exposure pathway?

Answer:-

Exposure pathway a route by which a radionuclide or other toxic material can enter the body. The main exposure routes are inhalation, ingestion, absorption through the skin, and entry through a cut or wound in the skin.

Read More Answers.

Question # 57



What is committed dose?

Answer:-

Committed dose a dose that accounts for continuing exposures expected to be received over a long period of time (such as 30, 50, or 70 years) from radioactive materials that were deposited inside the body. For more information

Read More Answers.

Question # 58

What is background radiation?

Answer:-

Background radiation ionizing radiation from natural sources, such as terrestrial radiation due to radionuclides in the soil or cosmic radiation originating in outer space.

Read More Answers.

Question # 59

Explain me what is epidemiology?

Answer:-

Epidemiology is the study of the distribution and determinants of health-related states or events in specified populations; and the application of this study to the control of health problems.

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Question # 60

What is assigned Protection Factor?

Answer:-

Assigned Protection Factor Assigned Protection Factor (APF) means the workplace level of respiratory protection that a respirator or class of respirators is expected to provide to employees enrolled in a continuing, effective respiratory protection program.

Read More Answers.

Question # 61

What is decay constant?

Answer:-

Decay constant is the fraction of a number of atoms of a radionuclide that disintegrates in a unit of time. The decay constant is inversely proportional to the radioactive half-life.

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Question # 62

What is electron volt (eV)?

Answer:-

Electron volt (eV) is a unit of energy equivalent to the amount of energy gained by an electron when it passes from a point of low potential to a point one volt higher in potential

Read More Answers.

Question # 63

What is biodosimetry?

Answer:-

Biodosimetry The use of physiological, chemical or biological markers of exposure of human tissues to ionizing radiation for the purpose of reconstructing doses to individuals or populations.

Read More Answers.

Question # 64

What is collective dose?

Answer:-

Collective dose (Animation) The sum of the individual doses received in a given time period by a specified population from exposure to a specified source of radiation

Read More Answers.

Question # 65

What is detector?

Answer-

Detector is a device that is sensitive to radiation and can produce a response signal suitable for measurement or analysis. A radiation detection instrument.

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