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VIVA :- Radiation Protection :

Question (1)

Answer :-

Role of Radiation protection officer in Radiology department.

Radiation Safety officer (RSO) are responsible for ensuring the safe use of ionizing radiation producing equipment at registered facilities in minnesota. RSO training is required, Registrants are responsible for x-ray equipment that is under their administrative control, and must ensure that the radiation safety/ quality assurance program, staff and use of x-ray equipment is in compliance with minnesota rule, the radiation safety/

quality assurance program, an RSO must be designated.

* The RSO is responsible for the day to day operation of the radiation safety / quality assurance program.
* The RSO must be RSO specific training and has additional responsibilities beyond their day to day job duties.
* The RSO must be provided sufficient time and commitment from the registrant to stop operation that he or she considers unsafe, ensure x-ray equipment is used safely, and compilance with MDH x-ray rules.
* These responsibilities, time and commitment must be delegated in writing from the registrant to the RSO.

Question (2)

Radiation protection :-

1) Minimize Exposure :-
Remember to minimize your exposure at all possible times.

2) Measuring your radiation dose :-

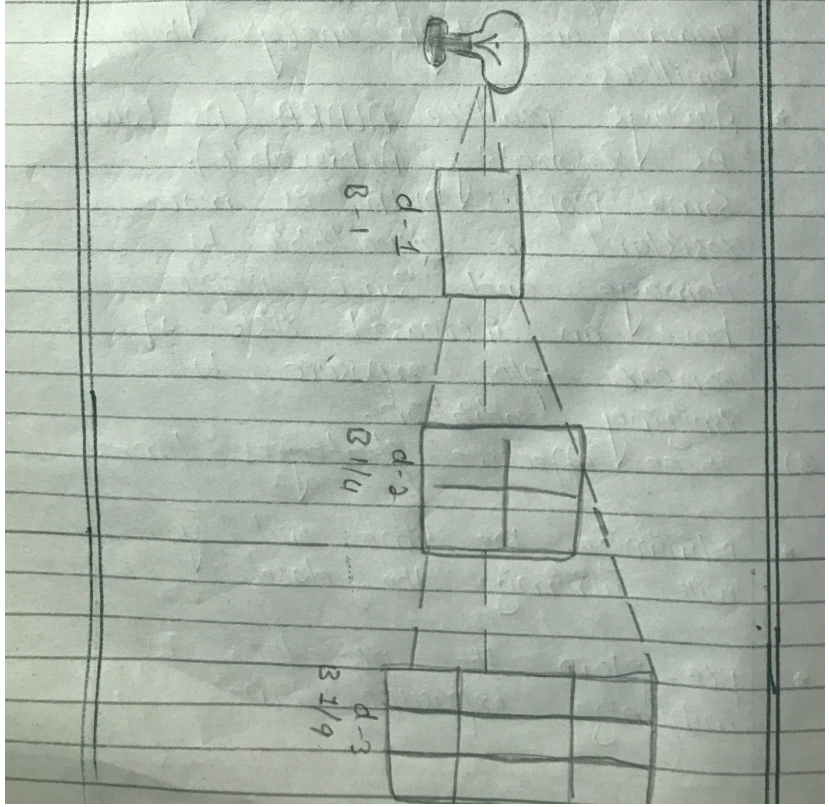
* use to measure the occupational dose equivalent from x-ray, gamma and high energy beta emitters.
* Always practice ALARA (As Low As Reasonably Achievable).
Some people's DNA is more resistant or susceptable to damage, and some people have an increased risk of cancer after exposure to ionizing radiation.

3) Three effective strategies time.

* Minimize the time and you will minimize the dose.
* pre-plan the procedure to minimize exposure time.

Three effective strategies distance.

- Doubling the distance from the source can reduce your exposure intensity by 75%. (inverse Square law)
- Know the radiation intensity where you perform most of your work, and move to lower dose areas during work delays.



(5) Three effective Strategies - Shielding.

* position shielding between yourself and the source of radiation at all permissible times. Take advantages of permanent shielding.
* Select appropriate shielding materials during the planning stages of the procedure.

(6) Room Shielding.
lead lined plaster board.
lead glass viewing window.

(7) Radiation protection in x-Ray
lead aprons attenuate Scattered radiation by 95%

Recommendations.

* Shield thyroid and gonads, always wear lead aprons and use dosimeter to monitor the exposure.
* CT Scan should be more Justified.
* There should be a universal x-ray bank where patient x-ray can be accessible any where, from any hospital.

Question (3)

Radiation Hazards

Radiation injury causes changes in the living tissues causing radiation sickness.

- Somatic effects - harmful to the person
- genetic effects - reflected in the offspring.

1) Radiation decomposition i.e Splitting of water into H^+ and OH and also splitting of other solvents of the body.
2) Kinetic energy of the incident photons heat up the molecule of the living tissues.
3) Incident radiation with travelling through the body tissue knock out the bound electron free from their parent atoms or molecules.

1 => lymphoid cells, Epithelial cells of the Small intestine, Haemopoetic cells, Geominal cells, Epithelial cells of the skin, Connective tissue cells, and mature bone.

=> Radiation Sickness :-

These effect Appear with in days or weeks after exposure and include

nausea, vomitions, fever, hemorrhage loss of appetite, etc are the dangerous effect of radiation.

Indirect effects:-

* Since 80% of the biological tissue in water.
* Most of the incident radiation energy is a absorbed by the water molecule and these are broken into very unstable and reactive components. these than react with body molecule and causes the cell damage.
* The biological effect are enhanced by the presence of oxygen which is always present in the cell.
* Ionization is another process where the radiation interact with matter to form ions.
* High energy electromagnetic radiation and particle radiation are capable of producing ions in their passage through matter.
* Types of ionizing radiation include Alpha and beta particles, x-rays, gamma rays etc. x-ray machine and radioisotopes are the two important and potential sources of ionizing radiation.

Question (4)

Radiation technologist can protect.

1. understand and apply the cardinal principle of radiation control: time, distance, and shielding.
2) Do not allow familiarity to result in false security.
3) Never stand in the primary beam.
4) Always wear protective an occupational radiation monitor and position it outside the protective apron at the collar.
5) Always wear protective apparel when not behind a protective barrier.
6) Always collimate to the smallest field size appropriate for the examination.

=) Radiation is a part our life. Background radiation coming primarily from natural minerals is around us all the time.

=) Fortunately, There are very few situation whose an average person is exposed to uncontrolled sources of radiation above background. it is wise to be prepared and know what to do if such a situation arises.

Time :- For people who are exposed for radiation in addition to natural background radiation, limiting or minimizing the exposure time reduces the dose from the radiation sources.

Distance :- The heat from a fire reduced as you move further away. the dose radiation decrease dramatically as you increase your distance from the source.

Shielding :- Barriers of lead, Concrete, or water provide protection from penetrating gamma rays and x-rays.

Annual Doses.

Activity	Typical Dose
=> Smoking	280 millirem / year
=> Radioactivity materials use in a UM lab	< 10 millirem / year
=> Dental x-ray	10 millirem per x-ray
=> Chest x-ray	8 millirem per x-ray
=> Drinking water	5 millirem / year
=> Coal Burning power plant.	0.165 millirem / year.