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## SECTION 1:-

Assignment: RADIATION PROTECTION

### Question:- 1:-

Describe the Role of  
Radiation protection officer in Radiology  
Department?

- Implement and oversee the operational aspect of the RPP.
- Ensure (for the licensee) that Radiation Safety activities are being performed in accordance with licensee-approved procedure and Regulatory Requirements
- Review and approve (with licensee management) RPP changes before implementation.
- Help identify and investigate Radiation Safety problems
- Initiate, Recommend, or provide corrective action for identified safety problems.

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- Verify implementation of Corrective action.
- Stop operation identified as unsafe
- Notify management of Radiation Safety problems, unsafe operations, and Corrective actions.
- Serve as member of the RSC (if applicable) and attend the meetings.
- Provide a link between the RSC and the users of ionizing Radiation.
- Provide the contact between the licensee and the Regulatory agencies.
- Be available for control by Facility Staff per Regulation and License conditions.
- Sign Semiannual Sealed-Sources Leak tests and inventories of Sealed Sources per Regulation.
- Provide advice on procedures for Disposal of Radioactive waste via authorized Contractors.
- Managing the Security of Radioactive Sources according to current National Requirements and Carry out periodic Security audits.
- Assessing that BPM is being applied.
- Advising Radiation protection Supervisors.

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- Advising on training in Radiation Safety.
- Advising on Selection of monitoring equipment and manage a system for the periodic calibration of Radiation and contamination monitors and associated Record-keeping.
- Managing Facility or Site Decommissioning.
- Auditing holdings and usage Records.
- Auditing waste accumulation in stores.
- Performing waste sampling when Required by the Regulator.
- Performing measurements to check Radiation Doses, Dose Rate and activity.

Question 2:-

Elaborate the Radiation protection measures in a Safe Radiology Department?

Safety measures in Radiology Department:-

- ★ The Radiology Department has a documented and implemented Safety plan.
  - There is a Safety plan that indicates the periodic inspection, maintenance, and calibration of all equipment.
  - The Safety plan involves the management of Radioactive materials used for therapeutic and Diagnostic purposes, particularly with regard to handling, storing, and transportations.
  - The Safety plan involves posting of safety warnings on the doors.
  - The Safety plan involves checking Female patient for pregnancy before exposure.
  - The Safety plan indicates monitoring of the staff for Radiation exposure, at least quarterly.
  - The Safety plan involves the provision and regular testing of Radiation protection aprons and thyroid and gonad shields for staff and patients.
  - Records are available indicating the

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Radiation Dosimetry tools and staff  
Radiation exposure for the past  
twelve months.

- The safety plan is implemented as evidenced by the daily practices

Radiology Department ensures the  
safety of Diagnostic imaging  
equipment

- ★ The Radiology Department ensure the following tests are conducted at least annually

- Automatic Exposure Control (AEC) test
- kVp reproducibility and Repeatability
- Half value layer test
- Alignment of collimator and x-ray field
- Mean glandular Dose test (for mammography)

- The Radiology
- A Radiation Safety program is in place, followed, and Documented, and compliance with the Facility management and infection control program is maintained.

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### Question 3:

what are Radiation hazards that one should be beware off.

- $\alpha$  → once it gets in it is highly Damaging to body tissue. Luckily it can't pass through skin but could be inhaled or ingested. Considered less Damaging than gamma rays or alpha particles.
- $\beta$  - lower interaction rate means it is much less Damaging to body tissue than alpha. used as medical tracers.
- $\gamma$  - Can be Dangerous Form of Radiation, as they are very penetrating Needs intense or prolonged Radiation to cause Damage to cells.

- Exposure to very high levels of Radiation, such as being close to an atomic blast, can cause acute health effect such as skin burns and acute Radiation Syndrome ("Radiation Sickness"). It can also result in long-term health effect such as Cancer and Cardiovascular Disease.

Is a Radiation hazard in the workplace  
A hazard in the workplace, Ultraviolet (UV) Radiation is a known cause of skin

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ageing, eye Damage, and may affect the immune system. people who work outdoors are the most likely of all workers to suffer health Damage from exposure to UV Radiation.

### What to do in Radiation hazard Situation

- Go Indoors if you hear the general alarm siren or another warning about a Radiation hazard Situation imminent to your place of Residence.
- close Doors, windows and ventholes tightly. cover cracks, for example with strong adhesive tape. Also close the fireplace, cooker hood and letterbox, and seal other cracks, if possible, cover the air conditioning channels and Stovepipes on the Roof. Thick walls and Roof are the most able to absorb Radiation. Stay in the middle of the building or in a cellar, and avoid room with large windows.
- Listen to instruction on the Radio or television. Do not use the telephone
- Take an iodine tablet only after the authorities have advised to do so (see the instruction on iodine tablets)
- protect Foodstuffs and drinking water in

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as airtight as possible, for example, in plastic bags or containers.

- It is usually necessary to shelter indoors for no longer than 24 hours. After the emission cloud has passed, there are no radioactive substances left in the open air. Air the room carefully and wipe the surfaces, because despite sealing precautions a certain amount of radioactive substances do enter houses.

- On the ground, in the water and on the surface of buildings there are radioactive particles that have fallen from the cloud. The authorities will give instructions on the necessary cleaning procedure and possible restrictions on the use of foodstuffs.



## Question 4:-

How a Radiation technologist can protect himself / herself from Radiation, what is annual occupational Dose.

The Following are the Safety measurements for the Radiologic technologists:

- x-ray Rooms have barrier walls and windows that keep exposure inside the Room. During these imaging procedure Radiologic technicians leave the Room, or stand behind a protective shield, such as curtain, that is designed to keep out Radiation.

Technicians also wear shielding devices, such as lead aprons, gloves, goggles and makes for Radiation protection whenever Necessary.

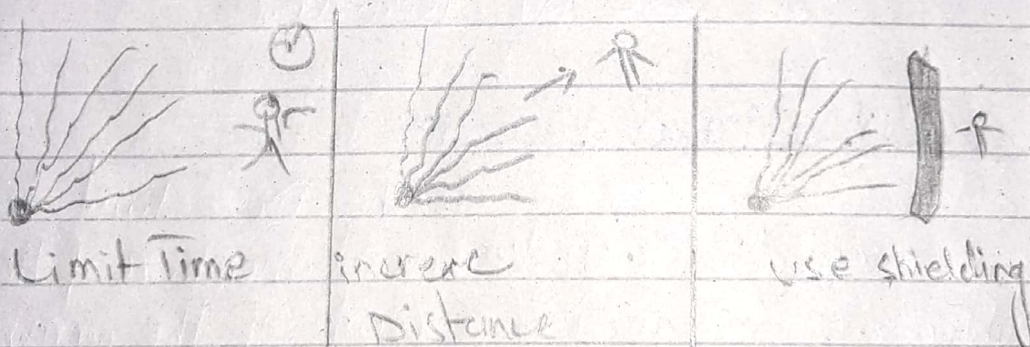
- Dose limits are Recommended by the international Commission on Radiological protection (ICRP). They are in place to ensure that individuals are not exposed to an unnecessarily high amount of ionizing Radiation. Dose limits are the

## Fundamental Component of Radiation protection

- one of the best ways to be prepared is to understand the Radiation protection principles of time, Distance and Shielding

### Time, Distance and Shielding

Time, Distance and Shielding action minimize your exposure to Radiation in much the same way as they would to protect you against overexposure to the sun.



### Time:-

For people who are exposed to Radiation in addition to Natural background Radiation, limiting or minimizing the exposure time Reduces the dose from the Radiation Sources

### Distance:-

Just as the heat from a fire Reduces as you move further away, the dose of Radiation decrease dramatically as you increase your Distance from the Sources.

## Shielding:-

Barriers of lead, concrete, or water provide protection from penetrating gamma rays and x-rays. This is why certain radioactive materials are used stored under water or in concrete or lead-lined rooms, and why dentists place a lead blanket on patient receiving x-ray of their teeth. Therefore, inserting the proper shield between you and a radiation source will greatly reduce, or eliminate the dose you receive.

## • Occupational Doses:-

The dose limit to non-occupational workers and members of the public are set at two percent of the annual occupational dose limit—organ, tissue occupational dose limits non-occupational dose limits

mem/year	msv/year	mrem/year	msv/year
whole	Body	5,000	50
lense of the eye,	15,000	150	NA
(skin and extremities)	Shallow dose	NA	NA

— The annual total for the whole body is 5,000 mrem.