

①

Name : Gulalai Zahid
ID # : 15175
Viva : Radiation Protection
Teacher : Mam. Atoofa

Question : 1

Role (F) Radiation Protection Officer (RPO) :

“Radiation protection officer (RPO) is a specialist in radiation safety and compliance matters and responsible for the protection from harmful effects caused by exposure to ionising radiation.”

1- RPO is responsible for recommending or approving corrective actions.



identifying radiation safety problems, initiating action and ensuring compliance with regulation.

2- RPO develop radiation protection plans in particular for nuclear plants and facilities.

3- RPOs have common core information on protection and safety as related to their field of practise.

4- RPOs also have knowledge about applicable regulation.

5- Radiation protection officer play role with radiation safety including workers, patients and also ensuring the appropriate condition of the equipment used.

6- RPO have specific responsibility



includes the explanation of local rules such as diagnostic radiology, radiotherapy and nuclear medicine.

- 7- RPO's also responsible for operation involving radioactive waste management in facility.
- 8- Radiation protection officer also play role for the protection from harmful effect caused by exposure to ionizing radiation.
- 9- The role of RPO is to support the University's work with ionising radiations by ensuring arrangements are in place of manage radiation risk, so work carried out safely.
- 10- RPO's investigating incidents and report incidents when appropriate.



to [redacted] relevant regulatory authority.

11- Managing [redacted] an inventory of equipment capable of emitting x-ray.

12- Managing system for provision of personal dosimetry and associated record-keeping.

13- Performing measurements to check radiation doses, dose rate and activity.

Question: 2

Radiation Protection measures in radiology department:

→ There are protection measures that indicate the periodic inspection, maintenance and calibration of all equipment in radiology department.

→ The phrase, As low as reasonably achievable "ALARA" is the basis for NCRP establishment of policies and procedures for radiation exposure.

⇒ The NCRP states that "The primary goal is to keep radiation exposure of the individual well ~~know~~

Well below a level at which adverse effects are likely to be observed during his lifetime.

Another objective is to minimize the incidence of genetic effect."

2- Minimize Exposure:

Remember to minimize exposure at all possible times.

3- Measure Radiation Dose - Dosimeters:

Use to measure the occupational dose equivalent from x-ray, gamma and energy beta emitters.
Always practise ALARA.

4- Three Effective strategies time:

Minimize the time and you will minimize the dose



①

Pre-plan the procedure to minimize exposure time.

5- Three Effective Strategies - Distance:

By doubling the distance from the source can reduce your exposure intensity by 25%. (Inverse square law)

Know the radiation intensity where you perform most of your work and move to lower dose areas during work delay.

6- Three Effective Strategies - Shielding:

Position shielding b/w yourself and the source of radiation at all permissible times.

Select appropriate shielding material during the planning stages of procedure.



8

7. Room Shielding:

Lead lined plaster boards
Lead glass viewing windows.
Radiation proof room walls.

Summary:

- > CT scans should be more justified.
- > patient education is important
- > console room arrangement.
- > Dosimeters (proper use)
- > checking female patient for pregnancy.
- > Regular testing of radiation protection.
- > Thyroid shield.
- > Safety plant is implemented

Question: 3

Hazards:

“ Hazard is an agent which has the potential to cause harm to a vulnerable target. Hazards can both natural and human induced. ”

Radiation Hazards:

“ Exposure to high level of radiation can cause acute health effects such as skin burns and acute radiation syndrome. It can result in long term health effects such as cancer and CVS diseases. ”

(10)

Radiation Hazards that one should beware of :-

→ Ultraviolet radiation as a hazard and also known as skin cancer, skin ageing, eye damage and may effects human immunity badly.

→ α - once it gets in it is highly damaging to body tissue but it can't pass through skin but could be inhaled or ingested.

→ β - used as medical tracers and damage tissue but less than α .

→ γ - dangerous form of radiation as they are very penetrating. prolonged radiation cause damage to cells.

→ Radiation decomposition occurs like



II

splitting of water into H^+ and OH^- in body.

→ The use of Radioisotope is a source of high activity may introduce another potential difficulty - that of radiation hazards.

→ Danger to health can arise from uncontrolled exposure to gross radioactivity and nuclear radiation is well known and need not elaborate here.

→ Thyroid is one of most radiosensitive parts of body. Most nuclear accidents release radioactive iodine into the atmosphere, it absorb by body and cause thyroid cancer.

→ The most current problem in pediatric radiology is the reduction of hazards to patient



12

from exposure to ionizing radiation.

→ Radiation cause damage to DNA and cause mutation which then pass to offspring and cause severe mutant changes.

13

Question: 4

How Technologist can protect himself/herself from radiation:

- 1) Technologist are welcome profession in a wide range of medical field.
- 2) They prepare patients and equipments for imaging procedure.
If we are planning to become a radiologic technologist, we may be concerned about exposure to radiation in profession.
- 3) They must wear appropriate equipments such as face shields and lead aprons.

(14)

2



- 4) They must keep record of x-ray exposure time by dosi-meter.
- 5) They must understand and apply the cardinal principles of radiation control: time, distance and shield.
- 6) They never stand in primary beam, nor hold a patient during exposure.
- 7) They must use gonad shield, lead apron and gloves.
- 8) They must collimate the field of view.
- 9) When technologist becomes pregnant she must notify her supervisor. The DL becomes 0.5 mSv for fetus.



15

- 10) They must check equipments periodically for possible leakage.
- 11) x-ray rooms should be barrier walls and windows that keep exposure inside but during procedures technologist leave the room and stand behind lead barrier.
- 12) They can control and limits their exposure to penetrating radiation by taking advantages of time, distance and shield.
- 13) During examination technologist must stand a certain distance away, that is called safety zone.

14) At insight Medical Imaging, safety is a top priority.



6

Annual occupational Dose:

➤ The dose limit to non-occupational workers and members of public are at two percent of the annual occupational dose limit.

➤ Organ, tissue occupational dose limits non-occupational dose limits

limits	mrem/year	mSv/year
	mrem/year	mSv/year
	5,000	50
	100	1

whole body

➤ Lens of eye shallow dose. 15,000 NA NA

➤ The annual total for the whole body is

5,000 mrem