(1) :-

Date: __/__/2

NAME :- HAFEEZ UMAH

ID #:- 14941

Discipline:- BS ~~Med~~ RAD

Semester:- Fourth

Submitted:-

MAM : Atooza Azmat

Assignment:

Radiation protection

Date:

13-7-2020

Date: __/__/20__

Q No: 1

Ans:

Role of Radiation Protection Officer in Radiology department

A radiation protection Officer (RPO) is a specialist in radiation safety and compliance matters and is an appointed position within hospital and safety services

* A safety officer assesses potentially hazardous situations, develops measures to protects people and the facility and monitors the implementation and maintenance of those programs. A radiations

Date: __/__/20

Safety officer or RSO holds those responsibilities within a healthcare facility using ionizing radiation for medical procedures.

- ✱ Managing environment agency permits including.
- ✱ Make application for new or variation to existing EA permits.
- ✱ Manage the collation of waste records and make pollution inventory returns to EA on behalf of the hospital.
- ✱ Advice on the use of exemptions under the environmental permitting regulation 2011.
- ✱ Advice on the ~~use~~ routes of radioactive waste disposal.
- ✱ Arranging the security

Date: __/__/20__

of radioactive sources according to current national requirments and carry out periodic security audits.

* Managing facility or site decommissioning.
* Arranging for disposal of radioactive waste to authorised contractors.
* Monitoring site activity against environment agency permit conditions.
* Expert inspection and auditing of storage and disposal facilities.
* Auditing holdings and usage records.
* Auditing waste accumulation in stores.
* Performing waste sampling when required by the regulator.
* Performing measurements.

Date: __/__/20__

to check radiation doses, dose rates and activity.

* Managing facility or Site decommissioning.
* Applying and managing maintenance of a best ~~pr~~ practicable means (BPM) culture in management.
* Managing a system for the provision of personal dosimetry and associated recording keeping.
* Advising on selection of monitoring equipment and manage a system for the periodic calibration of associated record keeping.
* Managing an inventory of equipment capable of emitting x-rays.

Date: __/__/20__

Q:-2 Radiation protection measure safe radiology department :-

Principal for radiation protection :-

There are three principal for radiation protection :-

① **Time :-**

Radiation exposure can be accumulated over the time of exposure.

② **Distance :-** A greater distance from the radiation source can reduce radiation exposure

③ **Shielding :-**

Procedure related protection :-

1. Minimize - Fluoroscopy time
2. Use Collimation
3. Take as few radiographic image as possible
4. Use magnification approprietly
5. Decrease the patient to image

Date: __/__/20

Receptor distance

(6) Increase the x-ray tube to patient distance.

(7) Be aware of tube angulations

Materials can block Radiation :-

Non-lead shielding material are manufactured with additives & binders mixed with additives & binders mixed with attenuating heavy metals that fall into the same category of materials as lead that also absorb or block radiation.

Optimisation of radiation protection:-

It ⇒ The process to keep the magnitude of individual doses, the number of people exposed & likelihood of potential exposure as low a reasonably achievable as low below the appropriate dose

Date: / /20

Radiation protection:.

Radiation protection is the science and practice of protecting people and the environment from the harmful effect of ionization radiation.

Radiation Protection measure:-

→ Following are the radiation protection measure in radiology department.

⇒ Their as a safety plan that indicate the periodic inspection maintenance and calibration of all equipment Safety plan involve safety posting warning in the doors.

Date: __/__/20__

⇒ They safety plan also involves the prevention and regular aprons and thyroid and gonad shilled for staf. and patient.

⇒ Record are auilable indicating the radiation dusimetry tools and staff radiation exposure for the past twelue month.

Radiation Exposure:

The

⇒ asik of exposure should balance of medical benefits.

⇒ Remimber to minimize exposure at all possible time.

⇒ Optimize radiation close by exposing the paticent to enough radiation

Date: __/__/20__

to get the clear image.

⇒ Medsure the occupational close equivilante from x-ray.

A) Gamma rays.

* High energy — beta emitters

⇒ Allow practice ALARA (As Low as Resonably Achievable)

⇒ Minimize the time by minimize close.

⇒ To minimize exposure time to preceduxe.

⇒ minimize time and of Yoel will minimize the time.

⇒ Position sheileling blw Yourself and the source of radiation at all permissible time take advantage permanent sheileling i.e: equipment or Existing structure.

Date: __/__/20__

⇒ Radiation protection in x-ray lead apron attenuates scatter radiation by 95%.

⇒ Doubling the distance from source can reduce your exposure intensity by 25%

⇒ Select appropriate shielding material during the planning ~~Safety~~ Stage of procedure.

Date: __/__/20__

Q No: 3

Ans:

Hazards Radiation:

⇒ It is radiation injury causes changes in the living tissues. causing radiation sickness.

⇒ Somatic effects - harm-ful to the person.

⇒ Genetic effects - reflected in the offspring.

(Mechanisms)

⇒ Radition decomposition:

i.e:-

Spliting of water into H and OH and also spliting of other solvents of the body.

⇒ Kinatic energy of the incident photons heats up the molecules

Date: __/__/20

of the living tissues.

→ Incident radiation when traveling through the body tissues knock out the bound electrons free from their parent atoms or molecules. These free electrons are highly unstable and interact with other atoms and molecules within the irradiated system.

⇒ Ionization is another process where the radiations 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

P-T-O

Date: __/__/20__

radiation include alpha and beta particles, x-rays, gamma rays, etc. X-ray machines and Radio-isotopes are the two important and potential sources of ionizing radiation.

Radiation hazard in Mention below:-

→ Sun lamps,
→ Beds.
→ Tanning booths.
→ Skin damage.
→ Hair removal.
→ Cell damage.
→ Eye damage
→ Skin cancer.
→ Chronic - Myelogenous
→ Malignant tumors
→ Leukemia
→ Cataract.

Date: __/__/20__

Q No: 4

Ans:

Protection of radiology technician

☆ Radiologist do not receive exposure from the primary x-ray beam.

☆ Exposure comes from scattered radiation as soon as the beam strikes an object

Cardinal principle of radiation protection:

→ Time.
→ Distance.
→ Shielding.

Time :-

The amount of exposure an individual receives is directly

Date: __/__/20

Proportional to the time of exposure. Therefore, minimize the amount of time spent with radiation source.

* Pulse of progressive fluoro can reduce radiology technician and caregiver dose by 90% are more.
* Fluoroscope have 5 minute reset timers to remind users of time elapsed.
* Time of fluoro procedures should be kept to a minimum.
* Fluoro should alternate on-off, rather than constant on.

* Distance:
* Just two steps back can greatly reduce exposure
* X-ray, CT, LINAC radiology technician

Date: __/__/20

Should be outside the room when machin is on.

* Fluoro remain as far away from patinte as possible when fluoro is on.

* Shielding:-

Any object b/w you and a source of radiation will provide some shielding. In general, the more dense an object or material the better the shield.

Protective Apparel:-

* must be worn during fluoro and possible imaging.

* Aprons must be inspected annually for leaks and stored

Date: __/__/20__

appropriately.

* Correction factors may be applied for personal close calculations.
* Recommended to contain at least 0.5mm lead equivalent.
* Lead aprons do not stop 100% of x-ray.

* Additional Sheilding:
* Drapes and equipment aprons.
* Mobile shields for stationary radiology like anesthesia techs.
* Ceiling mounted face sheilds (can reduce exposures by up to 40 times.).

Date: __/__/20

☆ Radiation Safety by Modality:-

- ☆ Fluoroscopy.
- ☆ Interventional.
- ☆ Mammography.
- ☆ CT.
- ☆ Surgery.
- ☆ Mobile.

☆ **Fluoroscopy:-**

☆ Personal exposure related to beam on time.

☆ **Mammography:-**

☆ low personal exposures.

☆ Normal walls and barriers adequate.

☆ Dosimetry probably not required.

Date: __/__/20

Computed Tomography:

- Personal exposure low.
- Collimated beam results in low Scatter.
- Personal can remain in room if necessary with legal aprons.

Mobile Radiography:-

- Usually no personnel closes.
- Be aware of location of tube or image receptor.
- Exposure coral long enough for tech to be out of Scatter area
- It is often not practical to stand more than 6 feet away.
- Tech should wear aprons.

Date: / /20

✱ X-ray and Pregnancy:-

✱ Human body is most sensitive to radiation effects before birth.

✱ Radiation worker who become pregnant are rarely at any significant risk of exposure.

✱ Pregnant worker will be concerned about her exposure.

✱ Training should be provided to inform her potential risks and available options.

Declare pregnancy:-

✱ Pregnant worker may declare pragnancy to RSO.

✱ Cannot be forced to declare pregnanay.

✱ Additional monitoring (monthly).

✱ Possible change of duties.

Date: __/__/20__

* Radiation Safety officer:
* Many institutions have an RSO.
(*) Required by ~~radiation~~ radioactive materials license.
* Often a radiologist.
* Provide safety training of radiological technicain.
* Ensure compliance with state or federal regulation.

Annual Occupational Dose.

⇒ The recommend annual acceptional close is 0.5 SV/Yr 5000 mrem/Yr.

⇒ But average radiological personal close per Year is 0.7 msv/Yr ~~from~~ for ~~Year~~ whole body exposure.

"The END"