Medical Technology

Limited-Scope

Limited Scope of Practice in Radiography Exam

Product Version

- ✓ Up to Date products, reliable and verified.
- ✓ Questions and Answers in PDF Format.

Latest Version: 6.0

Question: 1

Shielding against which of the following sources of ionizing radiation is the MOST difficult to provide?

A. Magnetic resonance imaging (MRO
B. Computed tomography (CT)
C. Flat film X-radiography
D. Positron emission tomography (PET)

Answer: D

Explanation:
Radiation from isotopes used in positron emission tomography (PET) comes from positrons emitted from atomic nuclei, when protons convert to neutrons. The positrons meet up with electrons (also called negatrons), and each positron/electron pair is annihilated. The result is gamma radiation, which is very penetrating. Shielding humans from this type gamma radiation is challenging. Magnetic resonance imaging CMRI) is not a source of ionizing radiation since it uses a magnetic field and radio waves to produce images. Computed tomography (CT) and flat film radiography both use X-rays, which can be blocked effectively with lead and other materials made of large atoms.

Question: 2

Radioactive dose absorbed by a material is expressed by using which of the following SI units?

A. Becquerel (Bq)
B. Gray (Gy)
C. Sievert (Sv)
D. Rad

Answer: B

Explanation:
The radioactive dose absorbed by a material is expressed in grays (Gy). According to the Systeme Internationale (SO, the becquerel (Bq) measures radioactivity, or 1 unit of atom disintegration per second. A sievert (Sv) refers to the absorbed dose equivalent in terms of the biological effect of radiation on human tissue in comparison to the effects of X-rays. For example, 1 Sv is the absorbed dose of any type of ionizing radiation producing biological effects equivalent to I Gy of X-ray exposure. A rad was the term used for the absorbed radioactive dose in the past; the current term used is a Gray. One rad equals 0.01 Cry.

Question: 3

Which of the following instruments detects X-rays by utilizing a low pressure gas that is ionized when radiation strikes it?

A. Scintillator
B. Gamma camera
C. Geiger-Müller counter
D. Photostimulable phosphor plate

Answer: C

Explanation:
A Geiger-Müller detector, or counter, detects ionizing radiation when a low pressure gas (helium, argon, or neon, plus halogens) is ionized after being struck by radiation. A scintillator is any material that becomes luminescent after it is excited by incoming radiation. Radiation striking the material is absorbed by electrons, which then give off energy as photons of visible light. A gamma camera is a type of scintillation detector that uses an array of photomultiplier tubes to form images, for instance, medical imaging after patients have ingested gamma-emitting radionuclides. A photostimulable phosphor plate is treated with photoluminescent phosphors that capture X-ray images.

Question: 4

Ionizing radiation doses associated with flat film chest radiography (lateral or posterior- anterior) typically fall within which of the following ranges?

A. 5—10 microsieverts (µSv)
B. 10-100 µSV
C. 0.1-1.0 millisieverts (mSv)
D. 5-100 mSv

Answer: B

Explanation:
Flat film chest X-ray radiography (lateral and posterior-anterior) typically imparts ionizing radiation doses in the range of 10 to 100 microsieverts (uSv), although this dose may be higher. Five to 10 LLSv would be the range for typical dental X-rays, although certain dental X-rays could exceed it. Most medical imaging procedures do not impart exposures of more than a few millisieverts (mSv), the range that most people receive yearly from natural radiation sources. There are certain exceptions, notably computed tomography (CT) scanning, which exposes patients to radiation doses in the multiple mSv range, as high as 40 mSv for whole body scans.

Question: 5

Which of the following represents the maximum dose of ionizing radiation dose that a declared pregnant worker may receive during the gestational period?

A. 0.5 millisieverts (mSv)
B. 5 mSv
C. 150 mSv
D. 500 mSv

Answer: B

Explanation:
During the gestational period, a pregnant worker who has declared her pregnancy may receive no more than 5 millisieverts (mSv) of exposure to ionizing radiation. Generally, supervisors prefer to keep their pregnant workers below this limit. If a declared pregnant worker's dose exceeds this limit (based on her radiation badge readings), she will not be assigned duties that will increase her exposure. To appreciate how conservative this occupation exposure limit is, keep in mind that the average exposure to ionizing radiation from natural background sources for an individual living in the United States is 3 mSv per year, or up to 6 mSv per year in high altitude locations such as Denver and Salt Lake City. If a radiation worker does not declare her pregnancy, her supervisor is not required to know about it, and thus has no obligation to change her duties. Other occupational dose limits include the maximum yearly exposure of the lens of the eye (150 mSv) and the maximum yearly exposure to any organ (500 mSv).