



Radiology

LSPR

ARRT Limited Scope of Practice in Radiography (LSPR)

Exam Version: 6.0

QUESTIONS & ANSWERS

DEMO VERSION

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Question 1. (Single Select)

Which of the following incidents requires direct quotations of the reason a patient leaves the hospital prior to an official discharge by the physician?

- A: Observation
- B: Same day surgery
- C: Hospital based diagnostic x-ray
- D: Elopement

Answer: D

Explanation:

Patients who leave the hospital against medical leave or elopement may require specific documentation, depending on state laws and facility policies. For instance, a form maybe completed for a patient who leaves against medical advice.

The individual charting in the medical record may have to include information, such as:

- the name of anyone and the relationship of this person to the patient who heard or witnessed a conversation where the patient stated he or she is leaving the hospital before official discharge by the physician
- documentation in direct quotation of the patient's words detailing the reason the patient left the hospital against medical advice
- the risks and the benefits relating to the patient leaving against medical advice
- documentation associated with the discharge instructions or any follow up care for the patient, even though the patient left against medical advice

Further, the health care professional should not chart in the patient's medical record his or her opinions, judgmental statements or anything offensive about the patient.

Studies have identified that patients who experience chest pain, use drugs or have mental health conditions are more likely to leave the hospital against medical advice (AMA).

Elopement is when the patient also leaves the hospital, is not officially discharged by the attending physician, and is in danger of harm and may even result in death of the patient. Documentation for patient elopement should include the date, time, and the individual who reported the patient's elopement. The documentation should be factual and specify without drawing conclusions the reason the patient left the hospital.

Question 2. (Single Select)

Which of the following best represents the weight of the human liver?

- A: 3-4 pounds
- B: 1-2 pounds
- C: 6-10 pounds
- D: 5-8 pounds

Answer: A

Explanation:

The correct answer to the question of how much the human liver weighs is 3-4 pounds. This weight range is typical for a healthy adult liver. The liver's weight can vary with the individual's body size and health condition, but for most adults, it remains within this range.

The liver is not only notable for its weight but also for its size and critical functions. It is the largest solid organ in the human body, playing a vital role in numerous physiological processes. These processes include metabolism, detoxification of various metabolites, protein synthesis, and the production of biochemicals necessary for digestion.

Anatomically, the liver is positioned in the right upper quadrant of the abdominal cavity, just below the diaphragm. It features a unique structure divided into four lobes: two major ones (the right and left lobes) and two smaller ones (the caudate and the quadrate lobes). Each lobe is made up of thousands of lobules, which are the functional units of the liver.

Understanding the weight and structure of the liver is crucial, as it helps in assessing the organ's health and function. Abnormalities in its weight or size can be indicative of various medical conditions such as liver disease, fatty liver, or other hepatic challenges. Therefore, the liver's typical weight range of 3-4 pounds is an essential reference point for medical professionals when evaluating liver health.

Question 3. (Single Select)

EPA states that at what rem level will one begin vomiting, due to radiation?

- A: 5-10 rem.
- B: 50 rem.
- C: 55 rem.

D: 70. Rem.

Answer: D

Explanation:

The correct answer to the question about the radiation level at which one begins vomiting, according to the EPA, is 70 rem.

Radiation safety is a critical component of public health, especially in contexts involving exposure to ionizing radiation, which can have severe biological effects. The Environmental Protection Agency (EPA) in the United States provides guidelines and sets threshold levels for exposure to radiation and the associated health effects. These guidelines are essential for ensuring safety in environments where radiation exposure might occur, such as in medical facilities, industries using radioactive materials, and nuclear power operations.

According to the EPA, the progression of symptoms resulting from increasing levels of radiation exposure is well-documented. At lower levels of exposure, the effects are generally less severe but can still indicate significant radiation poisoning. For instance, an exposure of 5-10 rem can lead to changes in blood chemistry, which might not immediately manifest as symptoms but can be detected through medical testing. As the exposure increases to 50 rem, more noticeable symptoms such as nausea can occur.

Once the exposure level reaches 55 rem, additional symptoms such as fatigue begin to set in, indicating more serious radiation poisoning. At 70 rem, the exposure is severe enough to cause vomiting, which is a direct response by the body to remove ingested toxins and is a clear signal of acute radiation syndrome. Further exposure only increases the severity of the symptoms: at 75 rem, hair loss can occur; at 90 rem, diarrhea; at 100 rem, hemorrhage; and at higher levels such as 400 rem, the exposure could potentially be fatal. Extremely high exposure levels, around 1,000 rem, lead to catastrophic health outcomes, including internal bleeding, death, and the destruction of the intestinal lining.

Understanding these exposure levels and associated health impacts is crucial for managing and responding to radiation emergencies. It helps in setting safety standards, planning protective measures, and conducting appropriate medical interventions when necessary. The EPA's guidelines serve not only as a standard for safety protocols but also for educational purposes, helping individuals and professionals recognize the risks and necessary precautions related to radiation exposure.

Question 4. (Single Select)

The ability to take electrons away from the atom through natural or human-made sources is called:

- A: electrostatics
- B: circuitry routing
- C: ionization
- D: fusion

Answer: C

Explanation:

Ionization is a process that happens when the electrons are removed from an atom. This ionization process involves the use of two sources to produce this type of ionization radiation – background or natural radiation and human-made radiation. With background radiation, the radiation occurs in nature and is unplanned but this radiation may still impact humans. A good example of background radiation is the radiation that comes from the sun or radiation that is produced from substances, radium or uranium, that are found on the earth, for instance. Humans may gain exposure from uranium or radium by inhaling the substances through the air or ingesting the substances when eating foods or drinking water. Human-made ionization radiation is emitted through x-rays, radiation produced from nuclear power plants, or radionuclides such as smoke detectors and radiopharmaceutical materials.

Question 5. (Single Select)

The part of the x-ray tube made out of Pyrex glass or metal is called:

- A: Envelope
- B: Rotor
- C: Autotransformer
- D: Generator

Answer: A

Explanation:

The correct answer to the question regarding the part of the x-ray tube made out of Pyrex glass or metal is the "Envelope." This component plays a crucial role in the structure and functionality of the x-ray tube. The envelope is essentially the housing that contains the x-ray tube's critical components, including the anode assembly and the cathode. These elements are integral to the generation of x-rays. The anode

assembly typically consists of a metal disc, often made of tungsten, which serves as the target for electrons emitted by the cathode. The cathode, on the other hand, is a filament that when heated, emits electrons towards the anode due to thermionic emission.

Materials used for the envelope include metal and Pyrex glass. These materials are chosen for their ability to withstand high temperatures and their properties of electrical insulation. Pyrex glass, in particular, is advantageous because it allows for visual inspection of internal components and is less prone to outgassing compared to other types of glass.

The dimensions of the envelope can vary but commonly, it might be around 10 inches in length and 6 inches in central diameter, with a peripheral diameter of about 2 inches. The size and shape of the envelope are designed to optimize the internal arrangement of components and ensure efficient operation of the tube.

Moreover, the envelope is sealed to create a vacuum environment inside the x-ray tube. This vacuum is critical as it allows electrons to travel from the cathode to the anode without interference from air molecules, which could scatter the electrons and reduce the efficiency of x-ray production. The removal of air is achieved with the help of a vacuum pump, ensuring that any air inside the envelope is evacuated. In summary, the envelope is a fundamental component of the x-ray tube, providing structural integrity, electrical insulation, and a vacuum environment that facilitates the efficient generation of x-rays. This explanation gives a comprehensive understanding of the role and importance of the envelope in the operation of an x-ray tube.

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