

Garrett Group X-ray Safety Quiz

Complete this quiz after reviewing the X-ray Safety Training Module online training materials. There is no time limit. You must score at least 80% to be considered acceptably trained. Retest may take place after a period of 7 days of additional study of the X-ray Safety Training Module online training materials.

- (1) The objective of the California State University, Northridge's Radiation Safety Program is to
- Maintain regulatory compliance
 - Establish good radiation safety working practices
 - Train you to use the X-ray generating equipment
 - Maintain a safe working environment for radiation users and the public
 - Provide safety information
- (2) All areas with X-ray machines must be posted with "Caution X-ray Radiation" signs
- True
 - False
- (3) Every person authorized to work with X-ray machines at CSUN is required to
- Be adequately trained in the operation of the machine
 - Know the relevant laws and safety rules
 - Observe the rules for their protection and the protection of others
 - Promote a safe work environment by following the safety and operating procedures
 - Wear an X-ray badge (dosimeter)
- (4) Which of the following will violate the fundamental principles of radiation protection?
- Removing a shielding material provided by the instrument manufacturer
 - Maintaining a safe distance when working around the machine
 - Overriding or defeating shutters or other safety equipment
 - Following the posted standard operating procedures
- (5) Any person working with an X-ray machine who becomes pregnant should...
- Read the Nuclear Regulatory Commission's Regulatory Guide section 8.13 "*Instruction Concerning Prenatal Radiation Exposure*"
 - Complete CSUN form 205 and send it to the Radiation Safety Officer (Anthony Pepe)
 - Notify the Primary Responsible Operator (Simon Garrett)
 - Stop all work immediately
 - Limit their exposure to 10% of the normal exposure
- (6) It is necessary to ensure all X-ray machines are secured from unauthorized use by locking the laboratory door when no-one is in the laboratory, regardless of whether the X-ray machine is operating or not
- True
 - False

- (7) What is the maximum permissible dose in a single year to the eye?
- 5 rem
 - 15 rem
 - 50 rem
 - 75 rem
- (8) Any worker using X-ray machines should be issued an X-ray badge (dosimeter) if their annual exposure exceeds what percentage of the annual dose limit?
- 0.1%
 - 10%
 - 50%
 - 100%
 - Any worker using X-ray machines should always be issued with an X-ray badge
- (9) What does the acronym ALARA mean?
- As low as readily attainable
 - As low as reasonably achievable
 - As long as reasonably available
 - As low as readily available
 - A lower amount (of) radiation absorbed
- (10) The hands and feet (extremities) can tolerate a higher dose of radiation than the internal organs?
- True
 - False
- (11) The fundamental principles of radiation protection include
- Shielding materials
 - Time of exposure
 - Distance from source
 - Protection of exposed skin by a laboratory coat
- (12) Completion of an initial and annual X-ray refresher training course is required of every X-ray machine user at CSUN
- True
 - False
- (13) All authorized users of X-ray machines must be specifically trained to operate the equipment by the Primary Responsible Operator (Simon Garrett)
- True
 - False

(14) Which of the following are correct ways to handle your radiation badge (dosimeter) if one is assigned to you?

- Wearing your badge when using the X-ray machine
- Wearing your badge all the time during any sleeping or waking activities
- Sharing your badge with a colleague
- Storing your badge away from any source of X-ray radiation
- Taking your badge home with you
- Repair, dismantle or alter your badge

(15) Written standard operating procedures must be available to all authorized users of X-ray machines

- True
- False

(16) The unit of effective dose is

- rad
- rem
- Roentgen
- Sievert

(17) The telephone number of the CSUN Radiation Safety Office/Officer is

- 818-677-0000
- 818-677-1400
- 818-677-2111
- 818-677-2401
- 818-677-3366

(18) A radiation survey meter must be calibrated

- True
- False

(19) If an X-ray machine is being used, which of the following must be available or posted?

- Notice to Employee document
- Emergency contact information
- Fire extinguisher
- "Caution X-ray Radiation" sign
- Manufacturer's manual for the X-ray machine
- Lead-lined apron

(20) X-rays are able to travel long distances through air or penetrate tissue

- True
- False

(21) X-rays are only produced by an X-ray machine when it is powered

- True
- False

- (22) For an open beam X-ray machine, it is acceptable to reach into the primary beam to change the sample if it is changed quickly
- True
 - False
- (23) For an open beam X-ray machine, it is acceptable to hold a sample in place using the fingers or hands if the effective exposure does not exceed the annual safe limit
- True
 - False
- (24) The amount of radiation damage to tissue depends on the intensity of the X-ray beam
- True
 - False
- (25) X-ray exposure to tissue always causes intense pain
- True
 - False
- (26) Acute X-ray exposure to tissue can cause burns
- True
 - False
- (27) Chronic X-ray exposure to tissue can have no symptoms for many years
- True
 - False
- (28) When working around X-ray machines, the level of radiation exposure for a worker must be maintained at zero
- True
 - False
- (29) The dose of radiation received is proportional to the duration of exposure
- True
 - False
- (30) The primary X-ray beam poses the greatest exposure risk, whereas leaked or scattered radiation pose less of an exposure risk
- True
 - False
- (31) Dosimeters may be required when working with closed beam X-ray systems
- True
 - False

(32) Open beam X-ray machines are generally more dangerous than closed beam X-ray machines

- True
- False

(33) What is the occupational exposure limit for acute whole body exposure when working with X-rays?

- 1 rem per calendar year
- 5 rem per calendar year
- 10 rem per calendar year
- 50 rem per calendar year
- 5,000 rem per calendar year

(34) Which of the following will cause an increase in the number of X-rays (X-ray intensity) produced by the PHI X-ray source?

- An increase in the anode high voltage
- An increase in the emission current
- An increase in the X-ray power
- A decrease in the anode high voltage
- A decrease in the emission current
- A decrease in the X-ray power
- Changing the anode from Al to Mg

(35) Biological effects produced by X-rays depend on which of the following factors?

- Dose delivered
- X-ray energy
- Length of exposure time
- Distance from the X-ray source
- Whether the skin is bare or covered by clothing
- Type of tissue exposed

(36) Which of the following provides protection against X-ray exposure?

- Air
- Stainless steel or other dense material shielding
- Leaded glass viewports
- Increasing distance from the X-ray source
- Dosimetry
- Vacuum

(37) The governing body for the use of X-ray producing equipment in the State of California is...

- The US Nuclear Regulatory Commission (NRC)
- The California Department of Health
- The State Nuclear Regulatory Authority
- The US Department of Homeland Security

(38) The PHI X-ray source can be operated while the vacuum chamber enclosure is at atmospheric pressure

- True
- False

(39) The PHI X-ray source is an enclosed, closed beam system.

- True
- False

(40) The exposure rate for the primary beam from an analytical X-ray source can be as high as

- 4 rem/hour
- 40 rem/hour
- 400 rem/hour
- 4,000 rem/hour
- 400,000 rem/hour

(41) Which of the following conditions can contribute to potentially harmful X-ray exposure?

- Scattered radiation
- Leakage radiation
- Primary beam

(42) Which of the following signage must be present when X-ray generating equipment is permanently installed?

- CAUTION X-RAY RADIATION
- CAUTION HIGH VOLTAGE
- CAUTION THIS EQUIPMENT MAY PRODUCE LETHAL RADIATION
- DANGER
- Contact information for the Primary Responsible Operator and CSUN Radiation Safety Officer
- Notice to Employee document

(43) The X-ray generating equipment should be inspected...

- When it is modified in such a way as to increase the potential risk of exposure
- When the equipment is moved
- When interlock or safety equipment is removed or altered
- The experimental procedures are changed substantially
- Periodically

(44) Which of the following is a common cause of accidental X-ray dose?

- Bypassing interlocks or other safety equipment
- Inadequate training
- Lack of dosimetry
- Performing a new experimental procedure
- Complacency with procedures
- Allowing unauthorized users to operate the machine

(45) Failure to comply with appropriate restrictions and regulations can result in

- Required retraining
- Loss of equipment access
- Civil penalties
- Criminal penalties

(46) In the event of actual or suspected injury through excessive exposure, you should

- Seek medical attention if there are symptoms
- Notify the Police Department
- Use a radiation safety meter to measure the radioactivity of the exposed part
- Power down the X-ray source
- Notify the Primary Responsible Operator (Simon Garrett) as soon as possible
- Notify the CSUN Radiation Safety Officer (Anthony Pepe) as soon as possible

(47) What precautions should be observed in the practice of ALARA?

- Reducing time in proximity to the X-ray source
- Increasing distance from the X-ray source
- Increasing shielding around the X-ray source
- Monitoring exposure

(48) The principle biological risk from chronic exposure to X-rays is

- Increased risk of cancer
- Radiation burns
- Vomiting and diarrhea
- Death
- Headaches

(49) The average annual dose of radiation from all natural sources is approximately

- 0.4 rem
- 4 rem
- 40 rem
- 400 rem

(50) If proper safety procedures are followed, the risk of accidental exposure to X-rays from the PHI X-ray source is

- Zero
- Minimal
- Serious
- Certain

Name: _____

Signature: _____

Date: _____

Score: ____ / 50 = _____ %