California State University Northridge

Environmental Health & Safety

Form 206 – Radiation Safety Training Quiz

INSTRUCTIONS: Review the CSUN Radiation Safety Manual with special attention to the appendices: NRC Regulatory Guides 8.13 and 8.29; and "Radiation Safety: A Worker's Guide." Each employee is to answer the questions on this form, sign the certification on the last page and forward these materials to the CSUN Radiation Safety Officer (Mail Drop: 8284).

Student Name:_____ Student ID Number: _____

TRUE/FALSE QUESTIONS:

1. Exposure to ionizing radiation can cause cancer. T ☐ F ☐
2. Cells that normally proliferate more rapidly are most sensitive to ionizing radiation. T ☐ F ☐
3. Because alpha particles are slow moving, they are not an internal exposure hazard. T ☐ F ☐
4. Low energy beta emitters (e.g., H-3) cannot be detected with survey instruments; therefore contamination of laboratory equipment can be neglected. T ☐ F ☐
5. Cleaning up a radioactive material spill should be put off until the end of the day since you may spill more material, and it would be a waste of time to do it twice. T ☐ F ☐
6. It is acceptable to keep your lunch in a refrigerator labeled "Caution - Radioactive Material," as long as your lunch is tightly sealed. T ☐ F ☐
7. Radioactive material may be shipped from a vendor directly to the lab. T ☐ F ☐
8. It is an acceptable practice to leave radioactive material unsecured if you know exactly where it is and will be back WITHIN five minutes. T ☐ F ☐
9. CSUN policy permits the disposal of liquid radioactive materials in sink drains. T ☐ F ☐
10. Annual radiation refresher training is a mandatory requirement. T ☐ F ☐

MULTIPLE CHOICE QUESTIONS:

11. Your liquid waste container label should have which of the following items of information:
    - ☐ date of disposal
    - ☐ isotope and activity
    - ☐ identification of other hazardous materials and chemicals
    - ☐ all of the above
12. Before ordering radioactive materials you should:
    - ☐ Contact Environmental Health & Occupational Safety
    - ☐ Ensure the quantities are within the limit of your license
    - ☐ Dispose of all radioactive materials in the laboratory
    - ☐ a & b only
13. You accidentally spill a small amount of radioactive material on your skin. You should:
    - ☐ call the EH&S Office (X-2401 or 9-911)
    - ☐ go to the Student Health Center
    - ☐ wash skin gently with hand soap and water
    - ☐ first (c) then (a)

14. In keeping with the USNRC policy of maintaining radiation exposures "As Low As Reasonably Achievable" (ALARA), the CSUN Radiation Safety Committee has established an administrative policy that occupational radiation exposures not exceed:
    - ☐ 10% of the maximum legal exposure limit
    - ☐ 25% of the maximum legal exposure limit
    - ☐ 50% of the maximum legal exposure limit
    - ☐ 100% of the maximum legal exposure limit
15. Present radiation safety standards for occupational exposure to whole body radiation limits an individual's dose equivalent to:
    - ☐ 170 mrems/year
    - ☐ 5000 mrems/year
    - ☐ 100 mrem in one week
    - ☐ 12.5 mrem in one hour
    - ☐ 5 x (worker's age - 18 years) rems in one year
16. What is the average persons annual radiation dose in the United States due to non-occupational sources:
    - ☐ 2500 mrem/yr
    - ☐ 2000 mrem/yr
    - ☐ 360 mrem/yr
    - ☐ 30 mrem/yr
17. The most important factor for determining the exposure hazard of a particular isotope is:
    - ☐ Activity
    - ☐ Decay energy
    - ☐ half-value layer
    - ☐ physical state
18. Which type of radioactive decay produces light, fast moving particles?
    - ☐ Alpha
    - ☐ Gamma
    - ☐ Beta
    - ☐ None of the above
19. You have received an isotope quantity identified as 10 mCi. The Curie (Ci) is one unit for measurement of:
    - ☐ The ability of photons to produce ionizing radiation
    - ☐ Rate of radioactive events (eg. disintegrations per second)
    - ☐ The amount of energy absorbed by tissue
    - ☐ All of the above
20. You can reduce your exposure to radiation by doing the following:
    - ☐ Increasing your distance from the source
    - ☐ Decreasing the amount of time near the source
    - ☐ Provide shielding between yourself and the source
    - ☐ All of the above
    - ☐ None of the above
21. At a MINIMUM, how often must wipe tests be performed when using Carbon 14 or Tritium (3H):
    - ☐ Every week
    - ☐ Every day
    - ☐ After every experiment
    - ☐ A survey meter can be used instead of wipe tests with C-14 and H-3
22. Survey meters can be used for (check as many as appropriate):
    - ☐ Sulfur 35
    - ☐ Carbon 14

- Tritium (3H)
- Phosphorus 32

23. You are using P-32 in the lab and are using an appropriate GM counter. You check the battery to verify that it is functioning. Which of the following techniques is correct for detection of contamination:
    - Place the detector in contact with the surface to be monitored
    - Place the detector a few inches away from the surface and move it rapidly to assure a large area is scanned
    - First cover the detector with a plastic cover and do the same as in (b)
    - Place the detector near the surface and move it slowly while observing the meter reading or listening to the audio output.
24. Which of the following statements is **TRUE**:
    - Dosimeters should be worn with the printed information facing away from the part of the body where the highest dose is expected.
    - A CSUN issued dosimeter can be worn at another facility with approval from the RSO.
    - It is acceptable to occasionally expose your dosimeter to radiation in order to "test" it.
    - all of the above are true.
25. If you lose your film badge, you should:
    - notify the EH&S Office immediately to obtain a replacement
    - borrow someone else's badge
    - do without one until next month's badge arrives
    - estimate your exposure with a survey meter
26. What is the principal reason for wearing a dosimeter (ring or badge)
    - It signifies that the worker is authorized to work with radiation
    - The results from a film badge, TLD badge, or TLD ring comprise a permanent record of an individual's occupational radiation exposure history
    - The use of the badge replaces the need for surveys in the lab
    - The dosimetry will absorb the radiation and reduce the individuals exposure
27. Beta particles:
    - are emitted from the nucleus with discrete energies
    - are capable of creating bremsstrahlung radiation in materials
    - are essentially identical to a proton
    - all of the above
28. The abbreviation "mrem" indicates:
    - millirem, a unit of dose equivalent
    - millirad, a unit of dose
    - milliroentgen, a unit of exposure
29. High energy beta emitters (like P-32) are best shielded with a low atomic number (Z) material such as plexiglass or lucite rather than lead because:
    - they're lighter and less expensive than lead
    - the beta particles are less likely to create bremsstrahlung radiation in low Z materials
    - lucite is more effective than lead in absorbing beta particles
    - all of the above
30. The largest man-made source of background radiation is from:
    - smoke detectors.
    - televisions.
    - nuclear fallout.
    - medical uses (x-rays, nuclear medicine, radiation oncology, etc.).

31. Which of the following is (are) true for radiation exposure to an unborn child?

- ☐ An unborn child is most sensitive during the first three months of pregnancy.
- ☐ Radiation workers at CSUN who are pregnant, or are considering becoming pregnant should contact EH&S for additional radiation safety information.
- ☐ Pregnant workers need not be concerned with exposures to low energy beta emitters (e.g. tritium).
- ☐ All of the above.

CERTIFICATION: I have read and understand the material contained within this manual and my responsibilities as a user of radioactive materials and/or radiation-producing machines at CSUN.

Signature: _____ **Print Name:** _____ **Date:** _____

Privacy Notification:

The State of California Information Practices Act of 1977 requires CSUN to provide the following information to individuals who are asked to supply information about themselves:

The principal purpose for requesting the information on this form is to access radiation exposure history. CSUN policy, 17 CCR 30265.1, and 10 CFR 20.102 require maintenance of this information.

Furnishing all information requested on this form is mandatory - failure to provide such information will delay or even prevent completion of the action for which the form is being filled out. Information furnished on this form may be used by various CSUN departments for exposure records maintenance and will be transmitted to the state and federal governments as required by law.

The official responsible for maintaining the information contained on this form is the CSUN Radiation Safety Officer, EH&S, Northridge, CA 91330.

Pursuant to the Federal Privacy Act of 1974, you are hereby notified that disclosure of your social security number is mandatory. This record keeping system was established prior to January 1, 1975, pursuant to the authority of the trustees of the CSU under Article IX, Section 9 of the California Constitution. The social security number is used to verify your identity.