Radiation Safety Training Test  
(Radiation Users)

1. Ionizing radiation can be in the following forms:
   a. Alpha and Beta particles, infrared and microwaves.
   b. Ultraviolet A and B waves.
   c. Alpha, beta and neutron particles and gamma rays.
   d. All of the above.

2. What is the meaning of Annual Limit of Intake (ALI)?
   a. ALI is the yearly amount of radionuclide that can be ingested without injurious chemical effects.
   b. ALI is the annual limit of radionuclide that will give an internal dose equivalent of 5000 mrem.
   c. ALI is the maximum amount of dispersible radioactive material allowed in an uncontrolled area.
   d. None of the above.

3. What are the calculated surface contamination units used at Idaho State University (ISU)?
   a. Disintegrations per minute (DPM).
   b. Counts per minute (CPM).
   c. Curies
   d. All of the above.

4. Decay half life is defined as the following?
   a. The amount of time it takes any radioactive material to totally putrefy.
   b. The amount of time it takes for a given number of radioactive atoms to be reduced by one half through the process of radioactive decay.
   c. The amount of time it takes for a given number of radioactive atoms to totally disintegrate.
   d. None of the above.

5. What are sources of naturally occurring radiation exposure?
   a. Dental x-rays, tanning beds and microwave ovens.
   b. Dental x-rays, nuclear medicine treatments and food irradiation.
   c. Cosmic rays, terrestrial radiation, sources in the human body and radon.
   d. None of the above.

6. What is a possible effect of a large acute exposure in the range of 300-450 rads?
   a. Cancer.
   b. Mutations in the individuals’ offspring.
   c. There are no somatic effects.
   d. Nausea, vomiting, and death.
7. What is the whole body NRC annual dose limit and the ISU ALARA goal?
   a. 5 rem/year and 100 mrem/year.
   b. 50,000 rem/year and 5 rem/year.
   c. Limits are set by your lab supervisor.
   d. 360 mrem/years

8. Methods to reduce external radiation dose include:
   a. Minimizing time, maximizing distance and using available shielding.
   b. Maximizing time, minimizing distance and putting the source of radiation between you and a shield.
   c. Calculating dose rate using diffusion theory prior to entering any radiation field.
   d. All of the above.

9. If you double your distance from a point source of radiation, the radiation dose rate falls to _____ the original value.
   a. two times
   b. one tenth
   c. one fourth
   d. one eighth

10. Methods to reduce internal radiation exposure are:
    a. Cover all wounds or cuts.
    b. Do not eat or drink in areas controlled for radiological purposes.
    c. Do not smoke or chew in areas controlled for radiological purposes.
    d. All of the above.

11. What radiation users are required to perform bioassay analysis?
    a. Anyone who uses radionuclides at ISU.
    b. Anyone exposed to a radiation field of 100 mrem or more.
    c. Anyone who uses dispersible radioactive material in quantities of 1 ALIs/month or greater.
    d. No one at ISU is required to perform bioassay analysis.

12. When can temporary dosimetry be issued at ISU?
    a. On a case by case basis. Temporary dosimetry will not be used to circumvent training requirements.
    b. At your supervisors discretion.
    c. With the approval of the RSO.
    d. None of the above.
13. What is the definition of a Radiation Area (RAD Area) and what are the entry requirements?
   a. Any area with a dose rate of 100 mrem/hr.
      You must have Technical Safety Office permission to enter a Rad Area and you
      must be wearing appropriate personnel contamination clothing.
   b. Any area with radiation present.
      There are no entry requirements.
   c. Any area with uncontrolled dispersible radioactive isotope.
      The area must be surveyed for contamination.
   d. Any area with a dose rate of 5 mrem/hr and less than 100 mrem/hr.
      You must be authorized to enter a Radiation Area and must be wearing your
      personal dosimeter.

14. What are your actions for a spill of radioactive material which does not involve personal
    injury?
   a. If you caused an accidental spill, start to clean up if it is in your capability.
   b. If you found an unknown spill and felt uncomfortable about it, contact Technical
      Safety Office for assistance.
   c. Behave in a timely manner to minimize your exposure.
   d. All of the above.

15. A contamination meter reads 200 counts per minute (cpm) when performing a
    contamination survey for P-32. The efficiency on the detector states the efficiency for
    P-32 is 50%. How many disintegrations per minute (dpm) is the instrument measuring.
   a. 400 dpm
   b. 200 dpm
   c. 10,000 dpm
   d. 100 dpm

16. A contamination meter reads 30 cpm. The lab you are in uses tritium (H-3) exclusively.
    What is the contamination level of the lab in dpm.
   a. 30 dpm
   b. 300 dpm
   c. 50 dpm
   d. Most contamination meters are not able to measure tritium. You can not
      determine tritium contamination levels with the information given.

17. A personal dosimeter is issued to you, where are you allowed to use this dosimeter.
   a. When using radioactive material that is licensed to ISU only.
   b. The dosimeter may be used at the INL during a tour of selected radiation areas.
   c. You may wear it on numerous cross country flights to measure your dose due to
cosmic radiation.
d. You may wear it as part of your internship duties with the Department of Energy (on location at the INL)

18. What is the definition of Removable Contamination Limit (RCL)?
a. The maximum amount of contamination that can be taken out of the laboratory.
b. The maximum amount of removable contamination (allowed for each individual radionuclide) that can be measured on any surface (in dpm/100cm²)
c. The limit below which you clean up your lab prior to any required survey.
d. None of the above.

19. Who is allowed to order and receive radioactive material from stores?
a. Any university staff with a Radiation Safety program.
b. The Nuclear Regulatory Commission must be contacted for all radioactive material.
c. Radioactive material is ordered through the department secretary.
d. Your lab supervisor (professor) fills a purchase order which must be signed by the Radiation Safety Officer. For radionuclide pick up from stores, a Technical Safety Office person must receive the package.

20. When can you generate mixed hazardous waste?
a. Never.
b. With approval of the Radiation Safety Committee.
c. There are no restrictions on the generation of mixed hazardous waste.
d. Mixed hazardous waste is the responsibility of the chemical safety committee.

21. You are performing a contamination survey and find that the meter you are using is beyond the calibration date. What are your actions?
a. There are no actions required.
b. Finish the survey and call the Technical Safety Office immediately to verify the survey results and to calibrate the survey meter.
c. Do not perform any contamination survey, since the results will be in error.
d. Use an exposure survey meter as an acceptable alternative.

22. It becomes necessary to transport some radioactive material off campus. How will you accomplish this?
a. Double package the item and place a radioactive material sticker on the item prior to transport.
b. Radioactive material can not be transferred from the laboratory. Once your lab takes possession it must stay in the laboratory until the material decays away?
c. Contact the Technical Safety Office.
d. None of the above.

23. How often are Responsible Users/Radiation Users required to have training on the safe
use of radioactive materials?
a. Training in the use of radionuclides is at the discretion of the lab supervisor.
b. The user must have training prior to using radionuclides/exposure to radiation and yearly thereafter.
c. Training is on a biannual basis.
d. There are no training requirements for the use of radioactive material.

24. Who is responsible for the inventory of a laboratory's radioactive material?
a. The Responsible User.
b. The Technical Safety Office.
c. The Department Chairperson.
d. The Radiation Safety Officer.

25. What is the purpose of personal dosimetry?
a. Personal dosimetry provides legal record of the individual's exposure history.
b. Personal dosimetry protects the individual from exposure to radiation.
c. Personal dosimetry measures the amount of internal contamination that an individual receives from working with radioactive material.
d. None of the above.

26. The initial activity of a Cs-137 \( (T_{1/2} = 30 \text{ years}) \) source is 8 mCi. Which will be the activity after 90 years?
a. 2.67 mCi
b. 1 Ci
c. 1 mCi
d. 1 MCi
e. None

27. During the maintenance in a lab a worker was exposed to a dose rate of 10\(\mu\text{Sv/h}\). The worker completed the job in 2 hours. The total dose was:
a. 2 rem
b. 20 mSv
c. 10 \(\mu\text{Sv}\)
d. 2 mrem
e. None