

RADIOLOGICAL EMERGENCY RESPONSE OPERATIONS COURSE FINAL EXAMINATION

This exam is intended to test your mastery of the Radiological Emergency Response Independent Study course objectives. Using a soft lead (#2) pencil, record the best answer for each of the following questions on the attached answer sheet. There is only one correct answer for each question. When you have finished, prepare the answer sheet as directed and mail to the address provided. Your examination will be evaluated and the results returned to you as quickly as possible.

1. 10 CFR 20, Standards for Protection against Radiation, is an example of
 - a. a regulation.
 - b. an ICRP report.
 - c. a license.
 - d. a guidance document.

2. Molybdenum-99 (Mo-99) has a half-life of 66 hours. After 132 hours, how much of an initial sample of 10 Ci of Mo-99 would remain?
 - a. 10 Ci
 - b. 5 Ci
 - c. 2.5 Ci
 - d. 1.25 Ci

3. The measure used to account for biological effect upon tissue is the
 - a. roentgen
 - b. rad (or gray)
 - c. rem (or sievert)
 - d. becquerel

4. One terabecquerel (Tbq) equals 10^{12} becquerels. In longhand, one terabecquerel would be written as
 - a. 1,000,000,000,000,000 becquerels
 - b. 1,000,000,000,000 becquerels
 - c. 0.0000000000001 becquerels
 - d. 0.000000001 becquerels

5. In scientific notation, one millirem is written as
 - a. 10^{-3} rem
 - b. 10^{-4} rem
 - c. 10^3 rem
 - d. 10^4 rem

6. An example of a biological variability factor is
 - a. the size of the radiation dose received.
 - b. the duration of exposure.
 - c. the type of radiation.
 - d. the exposed person's age.

7. Which are the most radiosensitive cells?
 - a. Muscle cells
 - b. Blood cells
 - c. Nerve cells
 - d. Bone cells

8. The factor which determines where in the body an ingested radioisotope will be most likely to concentrate is its
 - a. nuclear properties.
 - b. physical properties.
 - c. chemical properties.
 - d. residential properties.

9. For emergency response use in keeping track of radiation exposure during the emergency operation, the appropriate dosimetry would be a
 - a. film badge.
 - b. pocket ionization chamber.
 - c. TLD badge.
 - d. survey meter.

10. To maintain a permanent record of radiation exposure, the appropriate dosimetry would be a
 - a. film badge.
 - b. pocket ionization chamber.
 - c. TLD badge.
 - d. survey meter.

11. In an emergency situation involving radioactive materials, that is managed under the Incident Command System, the person in charge of the scene is the
 - a. radiological response team captain
 - b. survey team leader
 - c. State Radiological Health Director
 - d. Incident Commander.

12. In an incident in which the radiation levels are high but there are no people at risk, time and distance could be incorporated into one protective action strategy by
 - a. staying out of the radiation area until a cleanup plan is developed.
 - b. building a protective wall around the radiation source.
 - c. using shovels to quickly bury the source of radiation.
 - d. sending radiological monitors into the radiation area on a rotating schedule.

13. The National Council on Radiation Protection (NCRP) and the International Council on Radiation Protection (ICRP) currently embrace what concept as a cornerstone of radiation protection philosophy?
 - a. TED (threshold erythema dose)
 - b. ALAP (as low as practicable)
 - c. ALARA (as low reasonably achievable)
 - d. TDS (time, distance and shielding)

14. A protective action guide (PAG) is
 - a. a set of NRC regulations for developing emergency response plans.
 - b. an analysis of the economic costs of evacuating versus in-place protection.
 - c. the nuclear plant licensee's operating manual.
 - d. a projected radiation dose at which a specific protective action is warranted.

15. During the early phase of a nuclear accident, the EPA Protective Action Guide (PAG) for evacuation or sheltering of the public is
 - a. .01 - 1.0 rem
 - b. 1.0 - 5.0 rem
 - c. 5.0 - 10.0 rem
 - d. 10.0 - 15.0 rem

16. The Department of Energy establishes a Federal Radiological Monitoring and Assessment Center (FRMAC) in the event of a significant radiological emergency for the purpose of
 - a. monitoring the performance of Federal agencies.
 - b. monitoring the performance of State and local agencies.
 - c. providing technical assistance to the States and the Lead Federal Agency (LFA).
 - d. all of the above.

17. During a radiological emergency, offsite authority and responsibility for the health and welfare of the general public rests with
 - a. State and local officials.
 - b. Department of Energy officials.
 - c. Federal Emergency Management Agency officials.
 - d. the Lead Federal Agency.

18. While conducting radiological monitoring operations at the scene of an accident, you are tapped on the shoulder and turn to face a reporter with a microphone and a cameraman with his videocamera aimed at your face. In response to the reporter's request for a status report, you
- point the meter at the reporter and tell her she has 10 seconds to leave or she will die of radiation sickness.
 - stop what you are doing and answer all of the reporter's questions.
 - follow your agency's plan for working with the media and refer the reporter to the Public Information Officer.
 - refer the reporter to the radiological responder who has the most technical background.
19. After an accidental radiation release, short-term environmental monitoring
- is performed by emergency responders and provides data for determining appropriate action levels and mitigating measures.
 - is performed by supporting or consulting personnel to provide detailed analyses of radiological hazards and accident consequences.
 - is performed only by the Department of Energy's FRMAC.
 - takes precedence over emergency rescue operations.
20. An environmental monitoring program must be in place so that in a nuclear incident, potential dose levels may be projected for
- whole body external exposure.
 - inhalation of suspended particulate radioactive materials.
 - ingestion of contaminated food and water.
 - all of the above.
21. The role of the radiological response team member in an emergency involving actual or potential radiation releases from a nuclear power plant is defined
- in State and local radiological emergency response plans.
 - by the nuclear plant operators.
 - by the Environmental Protection Agency's Protective Action Guides.
 - by the Federal Emergency Management Agency.
22. White radioactive labels on packages at an accident scene tell the responder
- the exposure rate from those packages will be high.
 - the exposure rate from those packages will be low.
 - the packages contain Fissile Class materials.
 - all of the above.

23. A radioactive placard on a vehicle indicates that
- a. it is an exclusive use vehicle.
 - b. it is a non-exclusive use vehicle.
 - c. it carries one or more packages labeled Radioactive Yellow III and/or LSA material.
 - d. exposure rates on the surface of the vehicle should not exceed 50 mrem/hr.
24. In defining a radiological problem it is important to consider
- a. the external radiation hazard.
 - b. the internal hazards - ways in which radioactive material may be inhaled, ingested or absorbed.
 - c. the injury hazards to on-site personnel.
 - d. all of the above.
25. The control zone in which response actions should be limited to the shortest possible entry time is the
- a. hot zone.
 - b. warm zone.
 - c. cold zone.
 - d. decontamination zone.