

# RADIOLOGICAL EMERGENCY MANAGEMENT FINAL EXAMINATION

1. A unit used to express the exposure an individual receives is the:
  - a. Rem/hr
  - b. Roentgen
  - c. Curie
  - d. Rad
  
2. The rem is a unit used to measure:
  - a. Radiation exposure
  - b. Radiation dose in terms of the amount of energy absorbed
  - c. Radiation dose in terms of the amount of the biological effect caused by the amount of energy absorbed
  - d. Radioactivity
  
3. Because of its low penetrating ability, the type of radiation which is usually only a hazard when inhaled or ingested is:
  - a. Alpha radiation
  - b. Beta radiation
  - c. Gamma radiation
  - d. Neutron radiation

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4. Which of the following is an example of proper units for expressing exposure rate?
  - a. Hr/R
  - b. R/hr
  - c. Hr:R
  - d. r:hr
  
5. Cosmic radiation and radiation from terrestrial sources are examples of:
  - a. Natural background radiation
  - b. Natural man-made radiation
  - c. Industrial sources of radiation
  - d. Radioactive sources used in the medical field
  
6. An example of a man-made source of radiation is:
  - a. Terrestrial sources
  - b. Cosmic radiation
  - c. Diagnostic radiation
  - d. Potassium-40 in the human body
  
7. The three factors which are important in protecting individuals from radiation are:
  - a. Time, shielding, and dose rate
  - b. Dose rate, time, and gender
  - c. Time, shielding, and distance
  - d. Distance, time, and dose rate

8. Radiation received by the body over a short period is:
  - a. Chronic exposure
  - b. Sublethal exposure
  - c. Acute exposure
  - d. Supralethal exposure
9. Chronic exposures are:
  - a. Amounts of radiation received over a short period of time
  - b. Amounts of radiation received over a very long period of time
  - c. Acute exposures which affect only critical organs of the body
  - d. Acute exposures which affect all parts of the body
10. Radioactive decay is defined as:
  - a. The decrease in the amount of any radioactive material due to the spontaneous emission of nuclear radiation from the nucleus
  - b. The decomposition of radioactive atoms due to lengthy exposure to direct sunlight
  - c. The gradual decrease in the number of radioactive atoms in radioactive material due to spontaneous fission
  - d. The decline in the strength of a radioactive source due to the combined effects of time, distance, and shielding
11. The key elements of emergency management are \_\_\_\_\_, Response, Recovery and, Mitigation.
  - a. Removal
  - b. Preparedness
  - c. Measurement
  - d. Employment

12. The majority of radioactive material shipments are made in this type of packaging.
  - a. Type A
  - b. Type B
  - c. Limited Quantity
  - d. Industrial
  
13. Type B packages must be able to meet Type A requirements and also withstand the effects of \_\_\_\_\_ conditions?
  - a. Higher radiation
  - b. Accident
  - c. Higher weight
  - d. Faster transportation speed
  
14. The label required for radioactive material packages with a maximum dose rate of 200 mR/hr at the surface of the package is:
  - a. Radioactive Yellow-II
  - b. Radioactive Yellow III
  - c. Radioactive White I
  
15. The label required for radioactive material packages in excess of 50 mr/hr but less than 200 mr/hr is:
  - a. Radioactive Yellow-I
  - b. Radioactive Yellow-II
  - c. Radioactive Yellow-III
  
16. To determine the amount of radioactive material in a package of radioactive materials, you would look at the:
  - a. Placard
  - b. Label
  - c. Package type

17. The distinctive symbol used to identify radioactive materials is the:
- Diamond
  - Tri-blade
  - White square
18. Unbroken radioactive material packages never have a surface radiation dose above this level:
- 50 mR/hr
  - 100 mR/hr
  - 500 mR/hr
  - 1,000 mR/hr
19. A member of the public should give lifesaving first aid to injured victims of a radiological transportation accident:
- Without delay out of concern for radiological hazards
  - After verifying that no radioactive material packages have broken open
  - After isolating the area
  - Immediately after notifying the appropriate authorities
20. In the United States, serious radiation exposures:
- Have not resulted from radiological transportation accidents due largely to the nature of the material transported and the use of appropriate protective packaging
  - Have resulted from improper labeling of radioactive material shipments
  - Have resulted from improper packaging of radioactive material shipments
  - Frequently result from radioactive transportation accidents due to the large number of such shipments
21. In every power plant that generates electricity, the following components are present:
- Heat source, steam generator, cooling tower
  - Heat source, turbine electricity generator, pump
  - Turbine electricity generator, pump, cooling tower
  - Pump, steam generator, cooling tower

22. A chain reaction results when a uranium atom is struck by \_\_\_\_\_ released by a nearby uranium atom undergoing fission.
- Electron
  - Proton
  - Gamma ray
  - Neutron
23. The three main barriers in a nuclear power plant to prevent release of fission products are the fuel rods, the reactor vessel, and the \_\_\_\_\_.
- Secondary coolant system
  - Containment building
  - Condensor
  - Control rods
24. To prevent fuel damage, decay heat must be removed from the reactor core:
- Until the reactor shuts down
  - After the reactor shuts down
  - Until the primary coolant system is activated
25. Control rods are used in a reactor core to:
- Absorb free neutrons
  - Are a source of free neutrons which are used to cause fission
  - Encase the nuclear fuel
26. In a pressurized water- reactor the primary cooling water:
- Boils in the core and is used to turn the turbine
  - Evaporates to the atmosphere using a cooling tower
  - Transfers its heat to the secondary cooling water in a steam generator

27. A large modern nuclear power plant has approximately \_\_\_\_ fuel assemblies in its core.
- 100
  - 50
  - 200
  - 500
28. Nuclear power plant emergency plans are required to incorporate actions for which of the following types of radiological hazards?
- Direct exposure to radiation from a plume of radioactive material
  - Blast effects
  - Fallout
29. In a \_\_\_\_\_, a major failure has occurred, but an immediate response by the public is not needed.
- General Emergency
  - Site Area Emergency
  - Alert
  - Unusual Event
30. If evacuation is required following a nuclear power plant accident, it is recommended that individuals living anywhere closer than \_\_\_\_ miles be evacuated.
- 2 to 3
  - 3 to 5
  - 5 to 10
  - 15
31. A detonation of a nuclear explosive above 100,000 feet of altitude is called \_\_\_\_\_.
- An air burst
  - A high-altitude burst
  - A sub-cosmic burst
  - A surface burst

32. Nuclear explosions can be \_\_\_\_\_ of times more powerful than the largest conventional weapon.
- a. Hundreds
  - b. Thousands
  - c. Millions
  - d. Billions
33. The total energy released in a nuclear explosion, is the explosion's:
- a. Thermal energy
  - b. Blast
  - c. Energy yield
  - d. Nuclear energy
34. The immediate destructive action of a nuclear explosion is caused by this.
- a. Heat
  - b. Radiation
  - c. Shock
  - d. Dust
35. A nuclear explosion which releases energy equivalent to 7,000,000 tons of TNT:
- a. Is called a 7 kiloton burst
  - b. Has an energy yield of 7 kilotons
  - c. Is called a 7 megaton burst
  - d. Has a thermal energy release of 7 million kilograms

36. Just as in an emergency resulting from a nuclear power accident, the three most important ways of reducing the radiation exposure from fallout from a nuclear weapon are:
- Time, shelter, and gender
  - Dose rate, distance, and time
  - Dose rate, distance, and shielding
  - Time, distance, and shielding
37. Radioactive fallout makes the surface it comes into contact with radioactive. (True or False?)
- True
  - False
38. Radiological survey instruments:
- Will not be very reliable after a nuclear detonation because of weak batteries and no sure way of checking the strength of those batteries
  - Will give just an approximate answer which will need to be corrected using the "7: 10 Rule of Thumb"
  - Are the most accurate and reliable means of determining exposure levels
  - Will be very reliable following a nuclear detonation since they usually use AC line current
39. According to the "7:10 Rule of Thumb," if the exposure rate one hour after detonation of a nuclear weapon is 500 R/hr, the exposure rate approximately 14 days later (343 hours) will be approximately:
- 50 R/hr
  - 5 R/hr
  - 0.5 R/hr
  - 0.05 R/hr
40. The 7:10 Rule of Thumb:
- Is 100 percent accurate
  - Helps estimate future exposure levels
  - Is more reliable than radiological survey instrument readings
  - Is accurate to within  $\pm 10$  percent

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41. Everyone is exposed to radiation on a continuing basis from either \_\_\_\_\_ or sources.
- a. Uranium, thorium
  - b. Radon, uranium
  - c. Natural, man-made
  - d. Terrestrial, extra-terrestrial
42. Radiation that individuals are exposed to on a continuing basis which is considered non life-threatening is also known as this kind of radiation?
- a. Cosmic
  - b. Intrinsic
  - c. Background
  - d. Uneventful
43. Just under half of man's exposure to external natural radiation comes from?
- a. Radon
  - b. Cosmic radiation
  - c. Rocks
  - d. Food
44. Radon dose comes primarily from its daughter products which are \_\_\_\_\_?
- a. Ingested
  - b. Counted
  - c. Inhaled
  - d. Touched

45. The two radionuclides which concentrate in seafood are:
- a. Lead and mercury
  - b. Thorium and mercury
  - c. Lead and polonium
  - d. Polonium and mercury
46. By far, the radionuclide used in most nuclear medicine procedures is:
- a. Carbon-14
  - b. Strontium-90
  - c. Technicium-99m
  - d. Cobalt-60
47. Nuclear medicine techniques work through the detection of this kind of radiation, injected into the body by adding a radioisotope to a certain drug:
- a. Alpha particles
  - b. X-rays
  - c. Gamma-rays
  - d. Neutrons
48. Cancerous tumor cells can be treated by high energy \_\_\_\_\_ or \_\_\_\_\_.
- a. Neutrons, alpha particles
  - b. Neutrons, electrons
  - c. Gamma rays, X-rays
  - d. Gamma rays, neutrons

49. Most debris from a nuclear weapons test:

- a. Fell immediately
- b. Was pushed into the troposphere
- c. Was pushed into the stratosphere
- d. Disintegrated

50. Many smoke detectors contain:

- a. Americium-241
- b. Carbon-14
- c. Strontium-90
- d. Iodine