Office of Radiation Safety Services

Radiation Safety Orientation
Knowledge Assessment

Name_____**Date:**_____

1. The number of electrons in a neutral atom equals the:

   A. Mass number
   B. Atomic weight
   C. Atomic number
   D. Nucleon number
   E. Valence number

2. Directly ionizing radiation does not include:

   A. Electrons
   B. Positrons
   C. Neutrons
   D. Alpha particles
   E. Beta rays

3. A substance is radioactive (emits ionizing radiation) when?

   A. It is heated to high temperature
   B. It is unstable and undergoes spontaneous decay
   C. It absorbs radio waves
   D. It changes states from solid to liquid

4. Which is a unit for measuring radioactivity?

   A. Radiogram
   B. Rad
   C. Becquerel
   D. All of the above

5. If a gamma source produces an exposure of 100mR at 50cm, the exposure at 100cm will be:

   A. 400mR
   B. 200mR
   C. 100mR
   D. 50mR
   E. 25mR

6. The largest natural radiation exposure to the U.S. population is the result of:

A Occupational exposures to radiation workers
B. Man-made environmental radiation exposures fallout and nuclear reactor effluents
C. Medical X-rays
D. Nuclear medicine procedures
E. Indoor radon

7. The rad or gray, describes:

A The energy level of alpha or beta particles
B. The amount of scatter a beam of radiation undergoes times the distance traveled.
C. The amount of energy left by radiation in tissue or other materials.
D. The amount of radiation traveling through the air.

8. A rem, or sievert, is a unit which:

A Is the dose equivalent allowing one to predict the biological effect of radiation dose
B. Applies only to x-rays and gamma rays
C. Can be used to calculate the amount of radiation absorbed by materials varying in density
D. All of the above

9. For what kind of radiation rem is not approximately equal to rad?

A Alpha particles
B. Beta particles
C. Gamma. rays
D. X-rays

10. Personnel monitors, such as film badges, are required for:

A Everyone working in a radiology department
B. Anyone who might possibly receive 10% or more of the MPD limit
C. Only those actually working with x-rays or radioactive materials
D, Personnel in areas adjacent to nuclear medicine or radiation research departments

11. Given the following instruments which is most sensitive for locating radioactive sources:

A Geiger tube survey meter
B. Ionization type survey meter
C. Thermoluminescent dosimeter (TLD)
D. Pocket dosimeter
E. Film-badge dosimeter

12. In which phase is the cell (genetic) most sensitive to radiation?

A. G1
B. S
C. G2
D. M
E. No difference

13. Elements which have the same Z but different A are called:

A. Isobars
B. Isomers
C. Isotones
D. Isotopes

14. If an administered radionuclide undergoes biological elimination, the effective half-life is _____ the physical half-life.

A. Longer than
B. Equal to
C. Shorter than

15. According to ALARA concept:

A. Non-occupationally exposed persons should not receive any radiation exposure.
B. The dose received by radiation workers should be as low as possible.
C. The doses received by technicians should not be of concern to the investigator.
D. A pregnant radiation worker should not receive any radiation exposure.

MATCH THE MOST APPROPRIATE INSTRUMENT TO THE RADIATION SAFETY PROCEDURE (USE ANSWERS ONLY ONCE)

A. Liquid scintillation counter
B. Sodium Iodide (Nal) well counter
C. Geiger-Mueller (GM) counter
D. Film badge

16) Wipe test of sealed gamma-ray source ( )
17) Wipe test of Tritium (H-3) ( )
18) Personnel monitoring ( )
19) Contamination survey for P-32 ( )

20. After 10 half-lives, the fraction of activity remaining in the source is:

A. $(1/10)^2$
B. (1/10)
C. Depends on the initial activity
D. $(1/2)^{10}$
E. (9/10)

21. In accordance with the Federal (NRC) and State (NJDEP) agencies the annual maximum permissible dose to the whole body for a radiation worker is:

A. 500 mR
B. 7500 mR
C. 5000 mR
D. 1250 mR
E. 5 mR

22. In accordance with the Federal (NRC) and State (NJDEP) agencies the dose to an embryo/fetus during the entire pregnancy, due to occupational exposure of a declared pregnant women the dose does not exceed:

A. 500 mR
B. 7500 mR
C. 5000 mR
D. 1250 mR
E. 5 mR

23. When working with radioactive materials one should:

A. Wear gloves and a lab coat
B. Not eat, drink, or smoke
C. Not apply cosmetics
D. All of the above

24. Shielding material for P-32 is:

A. Lead
B. Concrete
C. Steel
D. Plexiglas
E. None of the above

25. What procedures must be performed to determine that a portable GM survey meter is working properly:

A. Perform battery test
B. Locate and note check source reading in mR/hr on calibration certificate
C. Select appropriate meter scale (1x, 10x, etc.)
D. Open check source cover, if any, and place probe against it
E. Note meter reading in mR/hr and compare with calibrated value
F. If the value differ by +/- 10% contact Office of Radiation Safety Services(**ORSS**)
G. All of the above
H. None of the above

26. Frequency of lab survey (wipe test) is:

A. Daily
B. Weekly
C. Monthly
D. Yearly
E. None

27. Please provide at least one method of securing radioactive material in the laboratory:

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