

# 2016RSM

1. The three factors which are important to protect individuals from radiation are:

- a) Time, shielding, and distance
- b) Time, shielding, and dose rate
- c) Dose rate, time, and gender
- d) Distance, time, and dose rate

2. Which of the following is suitable for (A) and (B)?

“In case of shielding high energy beta ray source, you should wrap the (A) atomic number, and then cover their outside with (B).”

- a) Low – lead
- b) High – lead
- c) Low – plastic
- d) High – aluminum

3. Which of the following is NOT included in Radiation Protection System?

- a) Optimization of protection
- b) Justification of actions
- c) Dose limit for individual
- d) Minimization stochastic effect

4. Which of following is NOT correct in describing the natural radiation exposure?

- a) Some artificially increased natural radiation exposure is subject to control
- b) The most problematic matter is an internal exposure from radon
- c) The amount of natural radiation exposure dose is immaterial to neglect
- d) The natural radiation exposure dose is not a subject to manage because it is not controllable by human

5. Which of the following is false?

- a) Beta decay is a type of radioactive decay in which a beta particle and thereby transforms into an atom with a mass number 1 less
- b) Alpha decay is a type of radioactive decay in which an atomic nucleus emits an alpha particle and thereby transforms into an atom with a mass number 4 less and atomic number 2 less
- c) Radioactive decay is the process by which a nucleus of an unstable atom loses energy by emitting particles of ionizing radiation
- d) Induced gamma emission refers to the process of fluorescent emission of gamma rays from excited nucleus, and there isn't a change in an atomic number and mass number

6. In gamma rays interact with matter, which effect is occurred at low energy?

- a) Photoelectric effect
- b) Photonuclear reaction
- c) Electron pair creation
- d) Compton effect

7. Bremsstrahlung is a kind of :

- a) X ray
- b)  $\gamma$  ray
- c)  $\alpha$  particle
- d) Neutron

8. In radiation protection, the product of absorbed dose and the correction factor( $\text{rad} \times \text{QF}$ ) is used to determine :

- a) Ci
- b) Sv
- c) C/Kg
- d) J/Kg

9. What is a dose limit for a pregnant woman who is a radiation worker.

- a) Underbelly 1mSv, Annual Limit of Intake 1/10
- b) Underbelly 1mSv, Annual Limit of Intake 1/20
- c) Underbelly 2mSv, Annual Limit of Intake 1/10
- d) Underbelly 2mSv, Annual Limit of Intake 1/20

10. There are Film badge, Thermo luminescence dosimeter(TLD), and so on in the individual monitoring of radiation workers. These types of individual dosimeters use a filter, then chooses not a right role of the filter.

- a) Tissue-equivalent correction
- b) Background correction
- c) Distinction of radiation type
- d) Correction for energy dependence of radiation

11. Which of the following is the case which is subjected to the dose limit?

- a) Affected dose of general person who take a physical examination.
- b) Affected dose of an attending physician during giving a radiation treatment in the hospital
- c) Affected dose of inhabitant who live on the ground with higher natural background radiation level
- d) Affected dose of bodily tissue without diseased area when one is exposed to radiation for treating cancer

12. Which of the following is true for an explanation?

- a) Dose limit is defined the upper bound of a radiation dose for the external exposure
- b) Dose limit is defined the upper bound of a radiation dose for the internal exposure
- c) Effective dose limit of the radiation worker is 100 mSv per 5 years, but cannot exceed 20 mSv per year
- d) Effective dose limit of the radiation worker is 100 mSv per 5 years, but cannot exceed 50 mSv per year

13. As the result of measurement in a state opened and closed cover of compensated GM survey meter, doses were  $100 \mu\text{Sv/h}$  and  $30 \mu\text{Sv/h}$ , respectively. Which radiation fields were you exposed by?

- a) Gamma radiation field
- b) Beta radiation field
- c) Gamma and x-ray mixed radiation field
- d) Beta and gamma mixed radiation field

14. Choose incorrect combination.

- a) BGO Scintillator – beta ray
- b) ZnS(Ag) Scintillator – alpha ray
- c) Liquid Scintillator – Low energy beta ray
- d) LiI(Eu) Scintillator – measure thermal neutron

15. Which of the following is NOT true for the bioassay method?

- a) Measuring is simple and assessment is accurate
- b) Measure using the excretion of human body
- c) It is easy to take a specimen but complicated to handling
- d) Can measure  $\alpha$  radiation for internal exposure

16. Which of the following is not included in the quality inspection before using radiation dosimeter?

- a) Calibration check
- b) Radiation source responsiveness(sensitivity) check
- c) Power supply(battery) check
- d) Radiation source characteristics check

17. Which of the following is NOT correct distinguishing the differences at radiation accidents and other accidents?

- a) It mostly brings on an external wound
- b) It brings on radiation fatigue
- c) Radiation exposure is hard to feel with the five senses
- d) It is hard to distinguish between psychological symptoms and radiation exposure symptoms

18. Which of the following is the most sensitive to radiation? (on ICRP 103)

- a) Liver
- b) Bone
- c) Breast
- d) Vessel

19. Radiation produces biological effects indirectly by production of free radicals in :

- a) Water
- b) Glucose
- c) Carbohydrate
- d) Protein in the body

20. Which of the following is the minimum photon energy to create a pair of electron?

- a) 0.511 MeV
- b) 1.022 MeV
- c) 5.011 MeV
- d) 10.22 MeV

21. Choose the wrong statement about NaI(Tl) scintillators.

- a) They are weakly deliquescent.
- b) They have a high density and thus a high gamma detection efficiency.
- c) Tl is an activator to increase efficiency.
- d) They are weak against mechanical impact and heat.

22. Which of the following is not correct about deterministic effect and stochastic effect?

- a) Revealed time of deterministic effect is usually acute effect.
- b) Cancer, leukemia, genetic defect is the example of stochastic effects.
- c) Protection concept of stochastic effect is to maximize its danger in reasonable range.
- d) Occurrence mechanism of Deterministic effect is due to cell death by acute high dose exposure or acute reaction.

23. Which of the following is the critical organ of the radioactive Iodine?

- a) Liver
- b) Lung
- c) Colon
- d) Thyroid

24. Choose the wrong combination of items regarding radiation effect.

- a) Cataract -- Stochastic effect
- b) Leukemia -- Stochastic effect
- c) Leucopenia -- Deterministic effect
- d) Chromosomal abnormality -- Genetic effect

25. Choose the correct statement about Bergonie-Tribondeau's law.

- a) Radiation Susceptibility is increased at younger cells.
- b) Radiation Susceptibility is increased at the cell has restoration capability.
- c) Radiation Susceptibility is increased when cell division is relatively active.
- d) Radiation Susceptibility is increased at the cell is finished on differentiation.

26. Which of the following is true item for normal fire measurement concerned radio-isotope?

- a) Measure for blackout and water suspension
- b) Dealing with Risk of disperse from fire
- c) Confirmation of keeping place of radio-isotope source
- d) Relationship of the person concerned radiation safety and fire house

27. Which of the following is correct about normal measure of the accident with radiation exposure and radioactive contamination?

- a) Radiation protection
- b) Personnel safety protection
- c) Contamination expansion prevention
- d) Notification the person concerned

28. Which of the following is NOT concerned with a preventive measure of unnecessary radiation exposure?

- a) Sticking a warning light
- b) Sticking a safety regulation
- c) Wearing a film badge or thermo luminescence dosimeter(TLD)
- d) Sticking a signs for high level radioactive area

29. Which of the following is correct about a consultation of radiation exposure for the responsible person on the radiation safety?

- a) Magnify the explanation items about exposure in a consultation
- b) Explain an equal content to everybody in a consultation
- c) Consult with technical terms as much as practicable
- d) Must put the point across him/her during the consultation

30. Which of the following is NOT correct about a consultation of radiation exposure for the responsible person on the radiation safety?

- a) Construct the relationship of mutual trust
- b) Listen to a consultation of a person carefully
- c) Access with a position of expropriation to other person
- d) Go through with original idea with a ignoring other unnecessary opinion

31. Choose an incorrect answer about a radiation protection.

- a) Cannot restrict an act attendant upon a radiation exposure inappropriately
- b) Nobody can exceed the limitation of a radiation dose about the exposure management
- c) Prevent a definite effect, lower a probable effect to approvable level in a radiation exposure
- d) A justification of radiation protection means to maintain exposure reasonably achieve as low as possible in consider of economic and social factor in plan and act

32. Which of following is incorrect factor that affect designing shielding facilities about X-ray generator?

- a) Work Load
- b) Use Factor
- c) Radio-Activation
- d) Occupancy Factor

33. Which is the correct combination of factor that affects radiation damage?

- A) Radiation energy
- B) Biological half-life
- C) Stagnated portion in human body
- D) Radiation distribution and dose rate
- E) Physical and chemical characteristics of radionuclide

- a) A, B, E
- b) A, C, E
- c) A, B, C, E
- d) A, B, C, D, E

34. What is the not considerable statement when medical examination for injured person in the character of radiation injury?

- a) Radiation injury accompany with 'radiation contamination'.
- b) Radiation injury directly threatens one's life generally.
- c) Radiation injury appears characteristically with tissue as a level of exposure dose.
- d) A victim of radiation accident is highly dispirited because the radiation is recognized as really dangerous thing generally so far

35. What is the priority work in radiation management?

- a) Personal management
- b) Work management
- c) Environment management
- d) Radiation source management

36. When the distance from the source of radiation is doubled, the amount of radiation received will be :

- a) Doubled
- b) Tripled
- c) Reduced by 1/2
- d) Reduced by 1/4

37. Which of the following is correct for the each goals of radiation protection about stochastic effect and deterministic effect?

- a) Reduction – prevention
- b) Reduction – reduction
- c) Prevention – reduction
- d) Prevention – prevention

38. Which phenomenon is the correct answer from the combination of auger effect?

- a) Emission of gamma ray
- b) Emission of beta ray
- c) Emission of specific X-ray
- d) Emission of internal conversion electron

39. What is the wavelength of 1eV energy?

- a)  $1.24 \times 10^{-5} \text{m}$
- b)  $1.24 \times 10^{-6} \text{m}$
- c)  $1.24 \times 10^{-7} \text{m}$
- d)  $1.24 \times 10^{-8} \text{m}$

40. Which radiation has continuous spectrum?

- a) Gamma ray
- b) Internal conversion electron
- c) Beta ray, neutrino
- d) Alpha ray, specific X-ray

41. One atom named X has become  ${}_{Z-4}^{A-8}X$ . What is expected to be generated after some disintegrate?

- a) 1 alpha reaction, 2 gamma reactions
- b) 1 alpha reaction, 2 beta reactions
- c) 2 alpha reactions, 1 gamma reactions
- d) 2 alpha reactions, 2 beta reactions

42. Which of the following is not suitable for detection for neutron?

- a)  $\text{BF}_3$  counter
- b)  ${}^3\text{He}$  counter
- c) CSI (TI) Scintillation Detector
- d) Proton recoil counter

43. Gas-filled radiation detector is changed their character from impressed voltage. Which of following is correct for low voltage region?

- a) GM region
- b) Proportional region
- c) Ionization region
- d) Recombination region

44. Which of the following is correct for detection principle of the radiation detector?

- a) Ionization chamber – electron avalanche
- b) Chemical dosimeter – material change
- c) Semi-conductor detector – nuclear reaction
- d) Proportional counter – excitation of gas

45. Which of the following is correct for the character of scintillation materials in scintillation detector?

- a) Transition of excited electron must be rapid.
- b) Photon output and incident rays must be well proportioned.
- c) It must have a refractive index for high probability for total reflection light.
- d) It must have high efficiency of converting kinetic energy to the photon with charged particles.

46. Which of the following is considered for the Build-up factor in photon shielding?

- a) Dose contribution by secondary electron
- b) Dose contribution by the electron generation
- c) Dose contribution by the compton scattering
- d) Dose contribution by bremsstrahlung radiation

47. What is the mostly observed peak when the sample which releases 2.5 MeV energy gamma-ray is measured by the great volume High Purity Germanium radiation detector(HPGe) and Multi Channel Analyzer(MCA)?

- a) Photo peak
- b) Compton scatter
- c) Double escape peak
- d) Annihilation photon peak

48. Which interaction is the highest level of contribution in measuring of gamma ray?

- a) Ionization
- b) Photoelectric effect
- c) Pair electron creation
- d) Compton effect

49. What is the primary reason why GM counter is inappropriate to measure radiation dose?

- a) Dead time is long.
- b) Using gas is difference with air
- c) There is low possible that gas and radiation were reacted.
- d) Output pulse is not relevant to radiation type or energy

50. Which of the following is not true for protect the exposure from radiation dose rate in space?

- a) Isolate radiation substances or maintain the low density
- b) Increase number of the workers in order to prevent the concentrated exposure for one worker
- c) Attain proficiency by Mock-up Training
- d) Attain proficiency by Cold-up Training