MULTIPLE CHOICE

1. Matter is measured in _____.
   a. kilograms
   b. joules
   c. electron volts
   d. rems

   ANS: A
   Matter is measured in kilograms.

   DIF: Easy REF: p. 3 OBJ: Recognize the unit of measurement for matter.

2. Energy is measured in _____.
   a. kilograms
   b. joules
   c. electron volts
   d. B or C

   ANS: D
   Energy is measured in joules or electron volts.

   DIF: Moderate REF: p. 4 OBJ: Recognize the unit of measurement for energy.

3. Atoms and molecules are the fundamental building blocks of _____.
   a. energy
   b. radiation
   c. matter
   d. gravity

   ANS: C
   Atoms and molecules are the fundamental building blocks of matter.

   DIF: Moderate REF: p. 3 OBJ: List the fundamental building blocks of matter.

4. Ice and steam are examples of two forms of _____.
   a. matter
   b. radiation
   c. energy
   d. work

   ANS: A
   Ice and steam are examples of two forms of matter.

   DIF: Difficult REF: p. 4 OBJ: Describe states of matter.

5. The formula $E=mc^2$ is the basis for the theory that led to the development of _____.
   a. x-rays
   b. electromagnetic radiation
   c. nuclear power
   d. cathode ray tubes

   ANS: C
   The formula $E=mc^2$ is the basis for the theory that led to the development of nuclear power.

   DIF: Difficult REF: p. 5 OBJ: Understand the theory of energy-mass equivalence.

6. Radio waves, light, and x-rays are all examples of _____ energy.
   a. nuclear
   b. thermal
   c. electrical
   d. electromagnetic

   ANS: D
   Electromagnetic energy includes radio waves, light, and x-rays as well as other parts of the spectrum.

   DIF: Difficult REF: p. 4 OBJ: List types of electromagnetic energy.

7. A moving object has _____ energy.
   a. potential
   b. kinetic
   c. nuclear
   d. electromagnetic

   ANS: B
   A moving object has kinetic energy.

   DIF: Moderate REF: p. 4 OBJ: Identify various forms of energy.

8. What is the removal of an electron from an atom called?
   a. Ionization
   b. Pair production
   c. Irradiation
   d. Electricity

   ANS: A
   The removal of an electron from an atom is called ionization.

   DIF: Moderate REF: p. 5 OBJ: Understand ionization of matter.

9. Ionizing radiation is capable of removing _____ from atoms as it passes through the matter.
   a. neutrons
   b. protons
   c. electrons
   d. ions

   ANS: C
   Ionizing radiation is capable of removing electrons from atoms as it passes through the matter.

   DIF: Moderate REF: p. 5
   OBJ: Describe the process of ionization by ionizing radiation.

10. The energy of x-rays is _____.
    a. thermal
    b. potential
    c. kinetic
    d. electromagnetic

    ANS: D
    X-rays are a form of electromagnetic energy.

    DIF: Difficult REF: p. 5 OBJ: List the category of energy of x-rays.

11. The biggest source of man-made ionizing radiation exposure to the public is _____.
    a. atomic fallout
    b. diagnostic x-rays
    c. smoke detectors
    d. nuclear power plants

    ANS: B
    Medical x-ray exposure is the biggest source of man-made radiation.

    DIF: Difficult REF: p. 6
    OBJ: Understand the relative intensity of ionizing radiation from various sources.

12. In the United States, we are exposed to _____ mR/year of ionizing radiation from the natural environment.
    a. 0–5
    b. 5–20
    c. 20–90
    d. 100–300

    ANS: C
    We are exposed to 20–90 mR/yr of ionizing radiation from natural environmental sources in the United States.

    DIF: Difficult REF: p. 6
    OBJ: Understand the amount of natural environmental ionizing radiation to which the public is exposed in the United States.

13. The basic quantities measured in mechanics are _____, _____, and _____.
    a. volume, length, meters
    b. mass, length, time
    c. radioactivity, dose, exposure
    d. meters, kilos, seconds

    ANS: B
    The basic quantities measured in mechanics are mass, length, and time.

    DIF: Easy REF: p. 12 OBJ: List the basic quantities measured in mechanics.

14. An example of a derived quantity in mechanical physics is a _____.
    a. meter
    b. second
    c. dose
    d. volume

    ANS: D
    Volume is a derived unit.

    DIF: Moderate REF: p. 12 OBJ: Recognize an example of a derived quantity.

15. _____ is a special quantity of radiologic science.
    a. Mass
    b. Velocity
    c. Radioactivity
    d. Momentum

    ANS: C
    Radioactivity is a special quantity of radiologic science.

    DIF: Easy REF: p. 14
    OBJ: Recognize radioactivity as a special quantity of radiologic science.

16. Exposure is measured in units of _____.
    a. becquerel
    b. sieverts
    c. meters
    d. grays

    ANS: D
    Exposure is measured in units of grays.

    DIF: Moderate REF: p. 14 OBJ: Understand units of radiation measurement.

17. Today, radiology is considered to be a(n) _____ occupation.
    a. safe
    b. unsafe
    c. dangerous
    d. high-risk

    ANS: A
    Today, radiology is considered to be a safe occupation because of effective radiation protection practices.

    DIF: Moderate REF: p. 10 OBJ: Understand the risk of an occupation in radiology.

18. What does ALARA mean?
    a. All Level Alert Radiation Accident
    b. As Low As Reasonably Achievable
    c. Always Leave A Restricted Area
    d. As Low As Regulations Allow

    ANS: B
    ALARA means As Low As Reasonably Achievable.

    DIF: Moderate REF: p. 10 OBJ: Understand the meaning of ALARA.

19. Computed tomography was developed in the _____.
    a. 1890s
    b. 1920s
    c. 1970s
    d. 1990s

    ANS: C
    Computed tomography was developed in the 1970s.

    DIF: Moderate REF: p. 10
    OBJ: Relate history of the development of computed tomography.

20. Filtration is used to _____.
    a. absorb low-energy x-rays
    b. remove high-energy x-rays
    c. restrict the useful beam to the body part imaged
    d. fabricate gonadal shields

    ANS: A
    Filtration is used to absorb low-energy x-rays.

    DIF: Moderate REF: p. 12
    OBJ: Relate history of the development of computed tomography.