

Chapter 01: Essential Concepts of Radiologic Science
Bushong: Radiologic Science for Technologists, 11th Edition

MULTIPLE CHOICE

1. Matter is measured in _____.
- kilograms
 - joules
 - electron volts
 - rems

ANS: A

Matter is measured in kilograms.

2. Atoms and molecules are the fundamental building blocks of _____.
- energy
 - radiation
 - matter
 - gravity

ANS: C

Atoms and molecules are the fundamental building blocks of matter.

3. Ice and steam are examples of two forms of _____.
- matter
 - radiation
 - energy
 - work

ANS: A

Ice and steam are examples of two forms of matter.

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

ANS: C

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

5. Radio waves, light, and x-rays are all examples of _____ energy.
- nuclear
 - thermal
 - electrical
 - electromagnetic

ANS: D

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

6. A moving object has _____ energy.
- potential
 - kinetic
 - nuclear
 - electromagnetic

ANS: B

A moving object has kinetic energy.

7. What is the removal of an electron from an atom called?
- Ionization
 - Pair production
 - Irradiation
 - Electricity

ANS: A

The removal of an electron from an atom is called ionization.

8. Ionizing radiation is capable of removing _____ from atoms as it passes through the matter.
- neutrons
 - protons
 - electrons
 - ions

ANS: C

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

9. The energy of x-rays is _____.
- thermal
 - potential
 - kinetic
 - electromagnetic

ANS: D

X-rays are a form of electromagnetic energy.

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

ANS: B

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

11. In the United States, we are exposed to _____ mSv/year of ionizing radiation from the natural environment.
- 0 to 5
 - 5 to 20
 - 20 to 90

d. 100 to 300

ANS: A

We are exposed to about 3 mSv/yr of ionizing radiation from natural environmental sources in the United States.

12. _____ is a special quantity of radiologic science.
- Mass
 - Velocity
 - Radioactivity
 - Momentum

ANS: C

Radioactivity is a special quantity of radiologic science.

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

ANS: A

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

14. What does ALARA mean?
- All Level Alert Radiation Accident
 - As Low As Reasonably Achievable
 - Always Leave A Restricted Area
 - As Low As Regulations Allow

ANS: B

ALARA means As Low As Reasonably Achievable.

15. Computed tomography was developed in the _____.
- 1890s
 - 1920s
 - 1970s
 - 1990s

ANS: C

Computed tomography was developed in the 1970s.

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

ANS: A

Filtration is used to absorb low-energy x-rays.

TRUE/FALSE

1. Mass is the quantity of matter as described by its energy equivalence.

ANS: T

Mass is the quantity of matter as described by its energy equivalence.

2. Radiation is the removal of an electron from an atom.

ANS: F

Ionization is the removal of an electron from an atom.

3. Radiology emerged as a medical specialty because of the Snook transformer and the Crookes x-ray tube.

ANS: F

Radiology emerged as a medical specialty because of the Snook transformer and the Coolidge x-ray tube.

Chapter 02: Basic Physics Primer

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MULTIPLE CHOICE

1. 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.

2. 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.

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

ANS: D

Exposure is measured in units of grays.

4. What is the decimal equivalent of the proper fraction $4/1000$?
- 0004
 - 004
 - 04
 - 4

ANS: B

The decimal equivalent of the proper fraction $4/1000$ is .004.

5. What is the decimal equivalent of the improper fraction $289/74$?
- 390
 - 3.90
 - 39.0
 - 390.0

ANS: B

The decimal equivalent of the improper fraction $289/74$ is 3.90.

6. The first step to expressing a number in scientific notation is to _____.
- round up to the nearest 1000
 - round down to the nearest 1000
 - write the number in decimal form
 - write the number as a fraction

ANS: C

The first step to expressing a number in scientific notation is to write the number in decimal form.

7. What is 6080 in exponential form?
- 6080.0×10^4
 - 608.0×10^4
 - 6.080×10^3
 - 6080×10^3

ANS: C

The number 6080 in exponential form is 6.080×10^3

8. Graphs are typically based on two axes; a _____ and a _____.
- y-axis; z-axis
 - oblique; horizontal
 - x-axis; y-axis
 - vertical; oblique

ANS: C

Most graphs are based on two axes: a horizontal or x-axis and a vertical or y-axis.

9. In radiologic science, all of the following are special quantities, except:
- exposure.
 - distance.
 - dose.