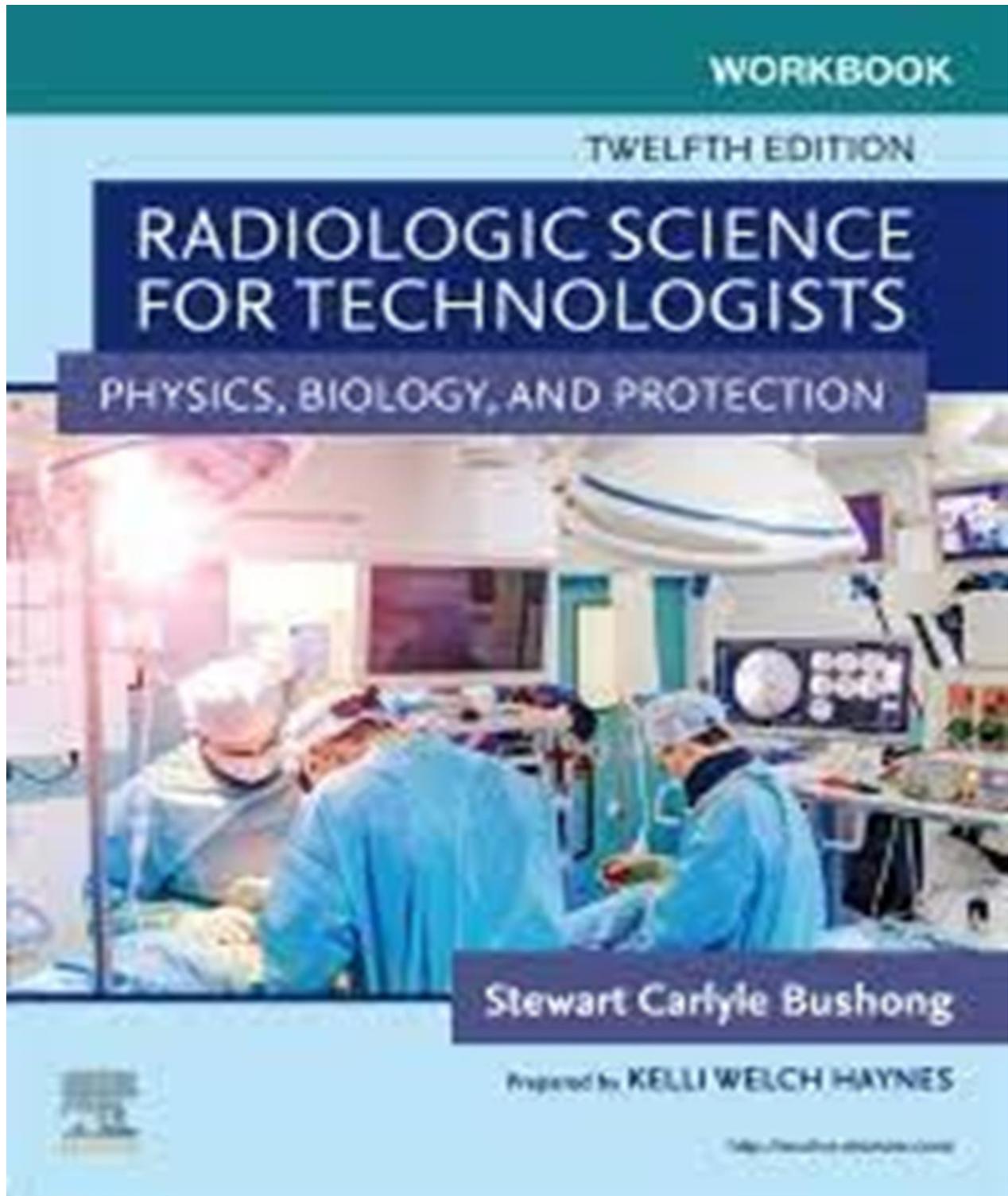


**Bushong Radiologic Science for Technologists,
12th Edition Test bank A+**



Chapter 01: Essential Concepts of Radiologic Science
Bushong: Radiologic Science for Technologists, 12th 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.
- a. Mass
 - b. Velocity
 - c. Radioactivity
 - d. Momentum

ANS: C

Radioactivity is a special quantity of radiologic science.

13. 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.

14. 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.

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

ANS: C

Computed tomography was developed in the 1970s.

16. 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.

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

Bushong: Radiologic Science for Technologists, 12th Edition

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.

d. effective dose.

ANS: B

In radiologic science, special quantities are those of exposure, dose, effective dose, and radioactivity.

10. Mass density should be reported in which units?
- Coulomb/kilogram
 - Newtons per square meter
 - Kilograms per cubic meter
 - Kilograms per square meter

ANS: C

Mass density should be reported with units of kilograms per cubic meter (kg/m^3).

11. The SI unit of velocity is_____.
- meters per second
 - miles per hour
 - meters per millisecond
 - kilometers per second

ANS: C

Units of velocity in SI are meters per second (m/s).

12. An object at rest will_____if no outside forces are applied.
- stay at rest
 - decrease mass
 - increase velocity
 - decrease velocity

ANS: A

An object at rest will stay at rest if no outside forces are applied.

13. Which of the following explains the difference between speed and velocity?
- One has motion, and the other does not.
 - One involves acceleration, and the other does not.
 - One involves time, and the other does not.
 - One has direction, and the other does not.

ANS: B

Velocity includes acceleration and speed does not. Speed is the rate at which an object covers distance.

14. For every action, there is an equal and opposite reaction, this describes which Newton's law?
- Newton's first law of motion
 - Newton's second law of motion
 - Newton's third law of motion
 - Newton's law of inertia

ANS: C

Newton's third law of motion states that for every action, there is an equal and opposite reaction.

15. Work is the product of _____ and distance.
- force
 - gravity
 - acceleration
 - motion

ANS: A

Work is the product of force and distance.

16. The transfer of heat by the emission of infrared radiation is _____.
- electric radiation
 - magnetic energy
 - mechanical energy
 - thermal radiation

ANS: D

Thermal radiation is the transfer of heat by the emission of infrared radiation.

17. What heat transfer takes place when you burn your finger by touching a hot iron?
- Conduction
 - Convection
 - Radiation
 - Electromagnetic

ANS: A

Conduction is the transfer of heat through a material or by touching.

18. What heat transfer takes place when water is boiled?
- Conduction
 - Convection
 - Radiation
 - Electromagnetic

ANS: B

Convection is the mechanical transfer of -hotll molecules in a gas or liquid from one place to another.

19. What are the two cryogens used in Magnetic resonance imaging with a superconducting magnet?
- Gaseous helium and gaseous nitrogen
 - Liquid helium and gaseous nitrogen
 - Gaseous helium and liquid helium
 - Liquid helium and liquid nitrogen

ANS: D

Liquid nitrogen and liquid helium are the two cryogens that are used in magnetic resonance imaging with a superconducting magnet.

20. When you stretch a rubber band, you are storing _____ energy.
- kinetic
 - potential
 - thermal