

Discovery of X-rays

Multiple Choice

Identify the choice that best completes the statement or answers the question.

- ___ 1. What type of tube was Roentgen working with in his lab when x-rays were discovered?
- Crookes tube
 - Fluorescent tube
 - High-vacuum tube
 - Wurzburg tube
- ___ 2. The letter x in x -ray is the symbol for:
- Electricity
 - The unknown
 - Penetrating
 - Discovery
- ___ 3. A ___ is a small, discrete bundle of energy.
- Phaser
 - Quark
 - Photon
 - Mesion
- ___ 4. The speed of light is:
- 3×10^8 meters per second
 - 3×10^8 miles per second
 - 186,000 miles per second
 - A and C
- ___ 5. When first developed, the branch of medicine using x-rays was called:
- Radiology
 - Radiography
 - Roentgenology
 - Imaging sciences
- ___ 6. X-rays can:
- Penetrate the human body
 - Be absorbed in the human body
 - Change direction in the human body
 - All of the above
- ___ 7. The radiologic unit that quantifies radiation intensity is the:
- rem
 - Becquerel
 - gray
 - roentgen
- ___ 8. The positive electrode of the x-ray tube is the:
- diode
 - cathode
 - anode

d. canode

True/False

Indicate whether the statement is true or false.

- ___ 1. X-rays are invisible.
A. True
B. False

- ___ 2. X-rays carry a negative charge that causes ionization.
A. True
B. False

- ___ 3. X-ray photons travel at the speed of light in a vacuum.
A. True
B. False

- ___ 4. X-ray photons are capable of traveling around corners.
A. True
B. False

- ___ 5. Chemical changes may occur as a result of exposure to ionizing radiation.
A. True
B. False

- ___ 6. X-rays will change direction in the presence of a strong magnetic field.
A. True
B. False

- ___ 7. X-rays produce a slight tingling sensation when they enter the body.
A. True
B. False

- ___ 8. X-rays cannot be focused with a lens.
A. True
B. False

- ___ 9. X-rays are able to interact with certain materials and produce light energy.
A. True
B. False

- ___ 10. It is impossible for x-rays to interact with matter and produce secondary radiation.
A. True
B. False

- ___ 11. X-rays can produce ionization of atoms making up cells, causing damage.
A. True
B. False

- _____ 12. Since Roentgen's discovery in the late nineteenth century, we have learned an enormous amount about the properties of x-rays.
- A. True
 - B. False

Discovery of X-rays

Answer Section

MULTIPLE CHOICE

1. ANS: A
Roentgen was working with a low-vacuum tube known as a Crookes tube.

PTS: 1 OBJ: 3
2. ANS: B
The letter x represents the mathematical symbol of the unknown.

PTS: 1 OBJ: 3
3. ANS: C
A photon, or quantum, is a small, discrete bundle of energy.

PTS: 1 OBJ: 4
4. ANS: D
The speed of light can be described as either 3×10^8 meters per second or 186,000 miles per second.

PTS: 1 OBJ: 4
5. ANS: C
What we now call *radiology* was first called *Roentgenology*.

PTS: 1 OBJ: 3
6. ANS: D
X-rays can penetrate, be absorbed in, or change direction (due to scattering) in the human body.

PTS: 1 OBJ: 6
7. ANS: D
The roentgen quantifies radiation intensity.

PTS: 1 OBJ: 3
8. ANS: C
The positive electrode of the x-ray tube is the anode.

PTS: 1 OBJ: 5

TRUE/FALSE

1. ANS: T
A characteristic of x-rays is that they are invisible.

PTS: 1 OBJ: 6
2. ANS: F
X-rays are electrically neutral.

PTS: 1 OBJ: 6

3. ANS: T
In a vacuum x-rays will travel at the speed of light.

PTS: 1 OBJ: 6

4. ANS: F
X-rays travel in straight lines, so they are unable to travel around corners.

PTS: 1 OBJ: 6

5. ANS: T
Chemical changes, such as in radiographic or photographic film, occur as a result of exposure to ionizing radiation.

PTS: 1 OBJ: 6

6. ANS: F
X-rays do not respond to a magnetic field.

PTS: 1 OBJ: 6

7. ANS: F
X-rays cannot be felt.

PTS: 1 OBJ: 6

8. ANS: T
Unlike visible light, it is not possible to focus x-rays with a lens.

PTS: 1 OBJ: 6

9. ANS: T
Certain materials will fluoresce, or produce light energy, when stimulated by x-rays.

PTS: 1 OBJ: 6

10. ANS: F
Secondary radiation is often produced as a result of x-rays interacting with matter.

PTS: 1 OBJ: 6

11. ANS: T
A major reason that unnecessary exposure must be avoided is that x-rays can ionize atoms and cause damage.

PTS: 1 OBJ: 6

12. ANS: F
Roentgen's original work on the characteristics of x-rays was so thorough that very little has been learned about their properties since.

PTS: 1 OBJ: 3