44 Lecture - PHY101

Important Mcqs

What is the de Broglie wavelength of an electron with a velocity of 1.5 x 10^6 m/s?

a. 0.253 nm

b. 2.53 nm

c. 25.3 nm

d. 253 nm

Answer: a. 0.253 nm

Which of the following phenomena demonstrates the wave-like behavior of matter?

a. Photoelectric effect

b. Compton scattering

c. Diffraction

d. None of the above

Answer: c. Diffraction

Which equation is used to calculate the de Broglie wavelength of a particle?

a. ? = h/mv

b. ? = h/mc

c. ? = h?

d. ? = hc/?

Answer: a. ? = h/mv

Which of the following particles has the smallest de Broglie wavelength?

a. A proton with a velocity of 10^6 m/s

b. An electron with a velocity of 10^7 m/s

c. A neutron with a velocity of 10^5 m/s

d. All particles have the same de Broglie wavelength.

Answer: b. An electron with a velocity of 10^7 m/s

In which experiment did electrons exhibit interference patterns like those of waves?

a. The photoelectric effect

b. The Compton effect

c. The double-slit experiment

d. The Stern-Gerlach experiment

Answer: c. The double-slit experiment

Which of the following is an example of a particle that exhibits wave-like behavior?

a. A proton

b. A photon

c. An electron

d. All of the above

Answer: d. All of the above

The momentum of a particle is related to its de Broglie wavelength by which equation?

a. p = h/?

b. ? = h/p

c. p = mc

d. ? = c/p

Answer: b. ? = h/p

Which of the following is NOT an example of wave-particle duality?

a. Electrons behaving like waves in a double-slit experiment

b. Photons behaving like particles in the photoelectric effect

c. Atoms behaving like waves in a diffraction experiment

d. None of the above

Answer: d. None of the above

The uncertainty principle relates the uncertainty in a particle's position to the uncertainty in its:

a. Momentum

b. Energy

c. Velocity

d. All of the above

Answer: a. Momentum

Which of the following is a consequence of wave-particle duality?

a. The Heisenberg uncertainty principle

b. The Bohr model of the atom

c. The law of conservation of energy

d. None of the above

Answer: a. The Heisenberg uncertainty principle