44 Lecture - PHY101

Important Mcqs

What is the de Bro	oglie wavelength o	of an electron	with a velocit	y 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 10⁶ m/s
- b. An electron with a velocity of 10^7 m/s

- c. A neutron with a velocity of 10⁵ m/s
- d. All particles have the same de Broglie wavelength.

Answer: b. An electron with a velocity of 10⁷ 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