

# 45 Lecture - PHY101

## Important Mcqs

**Which equation is used to describe the behavior of a quantum particle?**

- a) Maxwell's equations
- b) Newton's laws of motion
- c) Schrödinger equation
- d) Einstein's field equations

**Answer: c) Schrödinger equation**

**What is the smallest unit of energy in quantum mechanics?**

- a) Electron
- b) Photon
- c) Quark
- d) Proton

**Answer: b) Photon**

**Which of the following is NOT a postulate of quantum mechanics?**

- a) The state of a system is described by a wave function.
- b) The wave function must be normalized.
- c) Physical observables are represented by Hermitian operators.
- d) Only classical mechanics can accurately describe the behavior of particles.

**Answer: d) Only classical mechanics can accurately describe the behavior of particles.**

**What is the Heisenberg uncertainty principle?**

- a) The position and momentum of a particle cannot be simultaneously known with arbitrary precision.
- b) The energy and momentum of a particle cannot be simultaneously known with arbitrary precision.
- c) The position and energy of a particle cannot be simultaneously known with arbitrary precision.
- d) The spin and angular momentum of a particle cannot be simultaneously known with arbitrary precision.

**Answer: a) The position and momentum of a particle cannot be simultaneously known with arbitrary precision.**

**Which of the following particles are fermions?**

- a) Protons
- b) Electrons
- c) Photons
- d) Neutrons

**Answer: b) Electrons**

**What is entanglement in quantum mechanics?**

- a) The state in which two particles have the same spin.
- b) The state in which two particles have opposite spins.
- c) The state in which two particles share a wave function, making their properties correlated.
- d) The state in which two particles have different energy levels.

**Answer: c) The state in which two particles share a wave function, making their properties correlated.**

**What is the wave-particle duality?**

- a) The concept that light can behave both as a wave and a particle.
- b) The concept that electrons can behave both as a wave and a particle.
- c) The concept that photons can behave both as a wave and a particle.

d) The concept that all particles can behave both as a wave and a particle.

**Answer: d) The concept that all particles can behave both as a wave and a particle.**

**Which of the following is a consequence of the Pauli exclusion principle?**

- a) No two electrons in an atom can have the same set of quantum numbers.
- b) Electrons occupy the lowest energy levels available to them.
- c) Electrons move in circular orbits around the nucleus.
- d) Electrons can absorb and emit energy only in discrete quanta.

**Answer: a) No two electrons in an atom can have the same set of quantum numbers.**

**What is the role of the Hamiltonian operator in quantum mechanics?**

- a) It describes the position of a particle.
- b) It describes the momentum of a particle.
- c) It describes the total energy of a system.
- d) It describes the spin of a particle.

**Answer: c) It describes the total energy of a system.**

**What is a quantum state?**

- a) The position of a particle.
- b) The momentum of a particle.
- c) The total energy of a system.
- d) A mathematical description of the state of a quantum system.

**Answer: d) A mathematical description of the state of a quantum system.**