

Quantum Physics Fundamentals

Quantum Physics · Practice Test · 20 Questions

1. What is the smallest discrete unit of energy called in quantum physics?

- A) Atom
- B) Molecule
- C) Quantum
- D) Bit

2. Who is often called the 'father of quantum mechanics' for his groundbreaking work?

- A) Isaac Newton
- B) Albert Einstein
- C) Max Planck
- D) Galileo Galilei

3. Which famous thought experiment illustrates the superposition principle of quantum mechanics?

- A) Schrödinger's Cat
- B) Turing Machine
- C) Michelson-Morley Experiment
- D) Double-Slit Experiment

4. What property of light was explained by the photoelectric effect, a key quantum phenomenon?

- A) Its wave nature
- B) Its particle nature
- C) Its polarization
- D) Its speed

5. What fundamental principle states that it's impossible to know both the exact position and exact momentum of a particle simultaneously?

- A) Principle of Relativity
- B) Principle of Causality
- C) Heisenberg Uncertainty Principle
- D) Principle of Superposition

6. What are the two primary models used to describe light and matter in quantum physics?

- A) Wave and particle
- B) Solid and liquid
- C) Energy and mass
- D) Force and motion

7. What is the term for a particle of light?

- A) Electron
- B) Neutron
- C) Photon
- D) Proton

8. Which subatomic particle exhibits wave-particle duality, behaving as both a wave and a particle?

- A) Atom
- B) Molecule
- C) Electron
- D) Nucleus

9. What is the phenomenon where particles become linked, and the state of one instantly influences the state of the other, regardless of distance?

- A) Entanglement
- B) Superposition
- C) Interference
- D) Diffraction

10. What is the name of the mathematical function that describes the quantum state of a system?

- A) Energy level
- B) Wave function
- C) Momentum vector
- D) Atomic orbital

11. Which quantum mechanical concept describes a particle existing in multiple states simultaneously until measured?

- A) Quantization
- B) Tunneling
- C) Superposition
- D) Spin

12. Who developed the first widely accepted quantum mechanical model of the atom?

- A) Niels Bohr
- B) Ernest Rutherford
- C) J.J. Thomson
- D) John Dalton

13. What is the process by which a quantum particle can pass through a barrier that it classically shouldn't have enough energy to overcome?

- A) Reflection
- B) Refraction
- C) Tunneling
- D) Absorption

14. What does the quantization of energy mean in the context of atoms?

- A) Energy levels are continuous
- B) Energy can only exist in specific, discrete amounts
- C) Energy is always zero
- D) Energy is infinite

15. Which physicist proposed the idea that energy is emitted or absorbed in discrete packets, known as quanta?

- A) Albert Einstein
- B) Richard Feynman
- C) Max Planck
- D) Werner Heisenberg

16. What is the spin of an electron in quantum mechanics?

- A) A physical rotation like a top
- B) An intrinsic angular momentum
- C) The speed it orbits the nucleus
- D) Its charge

17. What is the primary application of quantum mechanics in modern technology, demonstrated by lasers?

- A) Gravitational waves
- B) Electromagnetism
- C) Stimulated emission
- D) Nuclear fusion

18. The double-slit experiment, a cornerstone of quantum physics, demonstrates the wave-like behavior of which particles?

- A) Only light
- B) Only electrons
- C) Both light and electrons
- D) Only atoms

19. What is the name of the particle that mediates the electromagnetic force?

- A) Graviton
- B) Photon
- C) Gluon
- D) W boson

20. Quantum computing aims to leverage which quantum phenomena for computation?

- A) Relativity and gravity
- B) Superposition and entanglement
- C) Thermodynamics and entropy
- D) Classical mechanics and wave propagation