

Foundations of Quantum Physics

Quantum Physics · Practice Test · 10 Questions

1. Who published the first theoretical derivation of the blackbody radiation law that introduced the concept of the energy quantum, h ?

- A) Max Planck
- B) Albert Einstein
- C) Niels Bohr
- D) Louis de Broglie

2. Which 1927 experiment conducted by Davisson and Germer provided the first direct experimental evidence of the wave-particle duality of electrons?

- A) Stern-Gerlach experiment
- B) Photoelectric effect measurement
- C) Electron diffraction on nickel crystals
- D) Cloud chamber observation

3. The first successful quantum mechanical model of the hydrogen atom, which quantized angular momentum, was proposed by whom in 1913?

- A) Werner Heisenberg
- B) Erwin Schrödinger
- C) Niels Bohr
- D) Wolfgang Pauli

4. In 1935, which physicist proposed a thought experiment to illustrate the 'incompleteness' of quantum mechanics, involving a cat?

- A) John Bell
- B) Erwin Schrödinger
- C) Richard Feynman
- D) Max Born

5. Which invention, developed by Gerd Binnig and Heinrich Rohrer at IBM in 1981, utilizes the quantum tunneling effect to image surfaces at the atomic level?

- A) Transmission Electron Microscope
- B) Atomic Force Microscope
- C) Scanning Tunneling Microscope
- D) Quantum Cascade Laser

6. Who was the first to mathematically formulate the uncertainty principle, stating that position and momentum cannot be simultaneously measured with arbitrary precision?

- A) Werner Heisenberg
- B) Paul Dirac
- C) Enrico Fermi
- D) Julian Schwinger

7. Which 1922 experiment by Otto Stern and Walther Gerlach provided the first experimental proof of space quantization of angular momentum?

- A) Neutron diffraction
- B) Spin-orbit coupling in silver atoms
- C) Photo-ionization of gases
- D) Blackbody radiation spectra

8. The first practical implementation of a quantum logic gate was demonstrated in 1995 using which physical system?

- A) Superconducting qubits
- B) Trapped calcium ions
- C) Quantum dots
- D) Diamond nitrogen-vacancy centers

9. Who formulated the first relativistic wave equation for the electron, which predicted the existence of antimatter?

- A) Wolfgang Pauli
- B) Richard Feynman
- C) Paul Dirac
- D) John Wheeler

10. The first experimental demonstration of quantum entanglement between two photons was achieved in 1972 by which researchers?

- A) Aspect and Grangier
- B) Freedman and Clauser
- C) Bell and Aspect
- D) Zeilinger and Pan