

Pioneers and Milestones of Quantum Mechanics

Quantum Physics · Answer Key · 15 Questions

1. Who was the first physicist to propose the quantization of energy to solve the ultraviolet catastrophe in blackbody radiation?

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

2. The 1927 Solvay Conference is famous for the debate between which two physicists regarding the interpretation of quantum mechanics?

- A) Werner Heisenberg and Erwin Schrödinger
- B) Albert Einstein and Niels Bohr**
- C) Max Born and Wolfgang Pauli
- D) Paul Dirac and Richard Feynman

3. Which experimental setup, first performed by Clinton Davisson and Lester Germer in 1927, provided the first definitive evidence for the wave-particle duality of electrons?

- A) Stern-Gerlach experiment
- B) Photoelectric effect measurement
- C) Electron diffraction on a nickel crystal**
- D) Cloud chamber tracking

4. In 1925, which physicist formulated the first complete version of quantum mechanics using matrix mechanics?

- A) Erwin Schrödinger
- B) Werner Heisenberg**
- C) Max Born
- D) Pascual Jordan

5. Who received the 1921 Nobel Prize in Physics specifically for his discovery of the law of the photoelectric effect?

- A) Max Planck
- B) Albert Einstein**
- C) Philipp Lenard
- D) Robert Millikan

6. Which scientist is credited with the first experimental demonstration of quantum entanglement in 1972, testing Bell's inequalities?

- A) John Bell
- B) Alain Aspect
- C) Stuart Freedman and John Clauser**
- D) Anton Zeilinger

7. What was the first quantum mechanical model of the atom to successfully incorporate quantized angular momentum, published in 1913?

- A) Thomson model
- B) Bohr model**
- C) Rutherford model
- D) Sommerfeld model

8. Which physicist first introduced the concept of 'spin' as a fourth quantum number to explain the anomalous Zeeman effect?

- A) Wolfgang Pauli
- B) Samuel Goudsmit and George Uhlenbeck**
- C) Otto Stern
- D) Walther Gerlach

9. Who discovered the Compton effect in 1923, providing the first direct evidence for the particle-like nature of X-ray photons?

- A) Arthur Compton**
- B) Peter Debye
- C) William Bragg
- D) Lawrence Bragg

10. What was the first device to utilize the principle of stimulated emission, predicted theoretically by Albert Einstein in 1917?

- A) Transistor
- B) MASER**
- C) Tunnel diode
- D) Superconducting Quantum Interference Device

11. Who was the first to propose the concept of 'matrix mechanics' in collaboration with Heisenberg and Jordan?

- A) Max Born**
- B) Wolfgang Pauli
- C) Paul Dirac
- D) Enrico Fermi

12. Which 1922 experiment proved the space quantization of magnetic moments in atoms by passing a beam of silver atoms through a non-uniform magnetic field?

- A) Franck-Hertz experiment
- B) Stern-Gerlach experiment**
- C) Davisson-Germer experiment
- D) Millikan oil drop experiment

13. In 1928, who published the relativistic wave equation that predicted the existence of antimatter?

- A) Werner Heisenberg
- B) Paul Dirac**
- C) Erwin Schrödinger
- D) Louis de Broglie

14. Which particle was the first to be experimentally identified as a direct consequence of the Dirac equation's prediction of 'holes' in negative energy states?

- A) Neutron
- B) Muon
- C) Positron**
- D) Neutrino

15. The first successful observation of a 'quantum jump' between two states of a single trapped ion was reported in which decade?

- A) 1940s
- B) 1960s
- C) 1980s**
- D) 2000s