

Dual Nature of Electrons



Here are **30 fill-in-the-blank questions** based on the topic **Dual Nature of Electrons** along with the **key answers**:

Fill in the Blanks

1. The concept of wave-particle duality was proposed by _____.
 2. The wavelength associated with a particle is given by the formula _____.
 3. The unit of Planck's constant is _____.
 4. The Davisson-Germer experiment confirmed the _____ nature of electrons.
 5. The de Broglie wavelength of a particle is _____ proportional to its momentum.
 6. Planck's constant is denoted by the symbol _____.
 7. The wave nature of electrons was experimentally verified by the _____ experiment.
 8. The Heisenberg Uncertainty Principle states that it is impossible to know both the _____ and _____ of a particle simultaneously.
 9. The wavelength of a moving electron is called the _____ wavelength.
 10. In the Davisson-Germer experiment, electrons were scattered by a _____ crystal.
 11. The energy of a photon is given by the formula _____.
 12. The de Broglie wavelength for an electron is given by the equation _____.
 13. The term for the smallest possible unit of energy in quantum mechanics is _____.
 14. The wave function of a particle represents its _____.
 15. The product of the uncertainties in position and momentum is always greater than or equal to _____.
 16. The de Broglie wavelength of a particle increases as its velocity _____.
 17. The Heisenberg Uncertainty Principle can be expressed as _____.
 18. The momentum of a particle is given by the product of its _____ and _____.
 19. The relation between energy and frequency for a photon is given by _____.
 20. The wavelength of a particle decreases as its mass _____.
 21. For a particle to exhibit significant wave-like behavior, its _____ must be very small.
 22. The wavelength associated with matter is called the _____ wavelength.
 23. The diffraction pattern in the Davisson-Germer experiment confirmed the _____ of electrons.
 24. The uncertainty principle shows that precise measurements of position and momentum are _____.
 25. According to de Broglie, every moving particle has an associated _____.
 26. The SI unit of momentum is _____.
 27. The speed of light in a vacuum is approximately _____.
 28. Quantum mechanics deals with particles that have very small _____.
 29. When electrons behave as waves, they can undergo phenomena like _____ and _____.
 30. The concept that light behaves both as a wave and as a particle is called _____.
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Answer Key

1. **Louis de Broglie**

2. $\lambda = \frac{h}{p}$
 3. **Joule-second (Js)**
 4. **wave**
 5. **inversely**
 6. **h**
 7. **Davisson-Germer**
 8. **position, momentum**
 9. **de Broglie**
 10. **nickel**
 11. $E = hf$
 12. $\lambda = \frac{h}{\sqrt{2meV}}$
 13. **quantum**
 14. **probability amplitude**
 15. $\frac{h}{4\pi}$
 16. **decreases**
 17. $\Delta x \cdot \Delta p \geq \frac{h}{4\pi}$
 18. **mass, velocity**
 19. $E = hf$
 20. **increases**
 21. **mass**
 22. **de Broglie**
 23. **wave nature**
 24. **impossible**
 25. **wave**
 26. **kilogram meter per second (kg·m/s)**
 27. $3 \times 10^8 \text{ m/s}$
 28. **mass**
 29. **diffraction, interference**
 30. **wave-particle duality**
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These fill-in-the-blank questions and their answers cover important aspects of the **Dual Nature of Electrons** topic, ideal for revision and practice.