

CHAPTER-3

CURRENT ELECTRICITY

Chapter 3 of the Physics NCERT Class 12 textbook delves into the principles and applications of current electricity, providing students with a comprehensive understanding of the flow of electric charge in a circuit. It introduces fundamental concepts such as electric current, resistance, and electromotive force (emf), laying the groundwork for the study of more complex electrical circuits and devices.

The chapter begins by defining electric current as the rate of flow of electric charge through a conductor. It explains the concept of drift velocity, highlighting that the movement of charge carriers in a conductor constitutes current flow. The relationship between current, charge, and time is elucidated, emphasizing that the unit of current is the ampere (A), which is defined as the flow of one coulomb of charge per second.

Moving forward, the chapter delves into the concept of resistance, emphasizing that it is a measure of the opposition to the flow of current in a conductor. It introduces Ohm's law, which states that the current passing through a conductor is directly proportional to the potential difference across the conductor and inversely proportional to the resistance of the conductor. The significance of Ohm's law in understanding the behavior of various electrical components is highlighted, providing students with a foundational understanding of the relationship between voltage, current, and resistance in a circuit.

Furthermore, the chapter explores the factors affecting the resistance of a conductor, such as its length, cross-sectional area, and material. It discusses the concept of resistivity, which quantifies the resistance offered by a unit length of the material having unit cross-sectional area. The relationship between resistance, resistivity, length, and cross-sectional area is established, enabling students to calculate the resistance of conductors of various dimensions and materials.

The chapter also introduces the concept of electromotive force (emf) and its distinction from potential difference. It explains that emf is the energy supplied by a source to each coulomb of charge, while the potential difference is the energy dissipated by each coulomb of charge in the circuit. The significance of emf in understanding the behavior of various sources of electrical energy, such as batteries and generators, is emphasized, providing students with insights into the practical applications of emf in electrical circuits.

In conclusion, Chapter 3 serves as a fundamental exploration of current electricity, enabling students to comprehend the principles governing the flow of electric charge and the behavior of various electrical components in a circuit. It lays the groundwork for a deeper understanding of more complex electrical phenomena and principles that are further explored in subsequent chapters.