# CHAPTER-2

# ELECTROSTATIC POTENTIAL AND CAPACITANCE

Chapter 2 of the Physics NCERT Class 12 textbook delves into the concepts of electrostatic potential and capacitance, building upon the fundamentals of electric charges and fields introduced in the previous chapter. It provides a comprehensive understanding of the potential energy associated with charged particles and the capacity of a system to store electric charge.

The chapter begins by defining electrostatic potential and illustrating how it is the potential energy per unit charge at a point in an electric field. It explains that the electrostatic potential at a point is directly related to the work done in bringing a unit positive test charge from infinity to that point. The concept of electric potential due to a point charge and a system of charges is elucidated, highlighting how the potential at a point is influenced by the configuration and distribution of charges in the vicinity.

Further, the chapter explores the concept of potential energy of a system of charges, emphasizing that the potential energy of a system of charges is the work done in assembling the charges from infinity to their respective positions. It introduces the notion of equipotential surfaces, which are surfaces where the electric potential is the same at every point. The properties and characteristics of equipotential surfaces are discussed, providing insights into their role in understanding the behavior of electric fields.

The chapter then delves into the concept of capacitance, elucidating that it is a measure of the ability of a conductor to store charge. It explains that capacitance is directly proportional to the charge stored and inversely proportional to the potential difference across the conductor. The discussion on parallel plate capacitors, their capacitance, and factors influencing their capacitance provides students with a practical understanding of how capacitors function in real-world applications.

Moreover, the chapter covers important topics such as the energy stored in a capacitor, emphasizing that the energy stored in a capacitor is equal to the work done in charging it. It also explores the various factors affecting the capacitance of a capacitor, such as the area of the plates, the distance between the plates, and the medium between the plates. The concept of a parallel plate capacitor in the presence of a dielectric material is also introduced, emphasizing how the presence of a dielectric affects the capacitance and the energy stored in the capacitor.

In conclusion, Chapter 2 serves as a crucial exploration of electrostatic potential and capacitance, enabling students to comprehend the principles underlying the storage of electric charge and the behavior of capacitors in electrical systems. It lays the groundwork for a deeper understanding of the complex electrical phenomena and principles that are further explored in subsequent chapters.