1. Title

Determination of the Characteristic Curve of a Diode

2. Abstract

This experiment aims to determine the characteristic curve of a diode by studying the relationship between the diode's forward voltage and the corresponding forward current. The forward voltage is gradually increased, and the resulting current is recorded. From this data, the characteristic curve is plotted, showing the non-linear behavior of the diode. The experiment helps understand the operation of a diode in different bias conditions and confirms the diode's exponential voltage-current relationship.

3. Introduction

A diode is a semiconductor device that allows current to flow in one direction while blocking it in the reverse direction. The characteristic curve of a diode shows the relationship between the current passing through the diode and the applied voltage. In forward bias, the diode starts conducting after reaching the threshold voltage, also known as the cut-in voltage. In reverse bias, the diode blocks current, except for a small leakage current until breakdown occurs.

This lab experiment focuses on the forward bias region of the diode, where the voltage-current relationship is non-linear and can be described by the Shockley diode equation. Understanding this curve is fundamental for electronics applications, including rectification and signal processing.

4. Apparatus Required

- Diode (e.g., 1N4007)
- DC power supply
- Resistor (for current limiting)
- Voltmeter (to measure diode voltage)

- Ammeter (to measure diode current)
- Breadboard and connecting wires
- Multimeter

7. Result Graph

- The graph can be plotted with **Forward Voltage (V)** on the X-axis and **Forward Current (mA)** on the Y-axis. The plot is expected to show a non-linear curve where the current remains negligible until a certain voltage is reached, after which it rises sharply.

8. Conclusion

- The experiment successfully demonstrates the characteristic curve of a diode. In forward bias, the diode does not conduct significantly until the threshold voltage (~0.7V for a silicon diode) is reached. After this point, the current increases exponentially with a slight increase in voltage. This behavior confirms the theoretical operation of a diode, validating the exponential relationship between current and voltage in the forward bias region.