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CURRENT ELECTRICITY (3).pdf

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Fundamentals of Current Electricity and Circuits

1 source

The source provides a comprehensive overview of fundamental concepts in **current electricity**, focusing heavily on the microscopic behavior of charge carriers and circuit analysis. It begins by defining **drift velocity** and the related concept of **relaxation time** for electrons moving within a conductor, leading to the **mathematical relationship between current and drift velocity**. The text then offers a **proof of Ohm's law** derived from these microscopic principles, extending it to the **microscopic or vector form** involving current density and electric field. Finally, the source addresses the characteristics of power sources and complex circuits, deriving equations for the relationship between **electromotive force (emf), internal resistance, and terminal potential difference** during both normal operation and **charging** of a cell, and concludes with formulas for the **series and parallel combination of cells** and the principles of the **Wheatstone bridge** for resistance measurement.

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How are microscopic electronic properties connected to macroscopic electrical circuit characteristics?

What fundamental physical princip current flow, resistance, and poten

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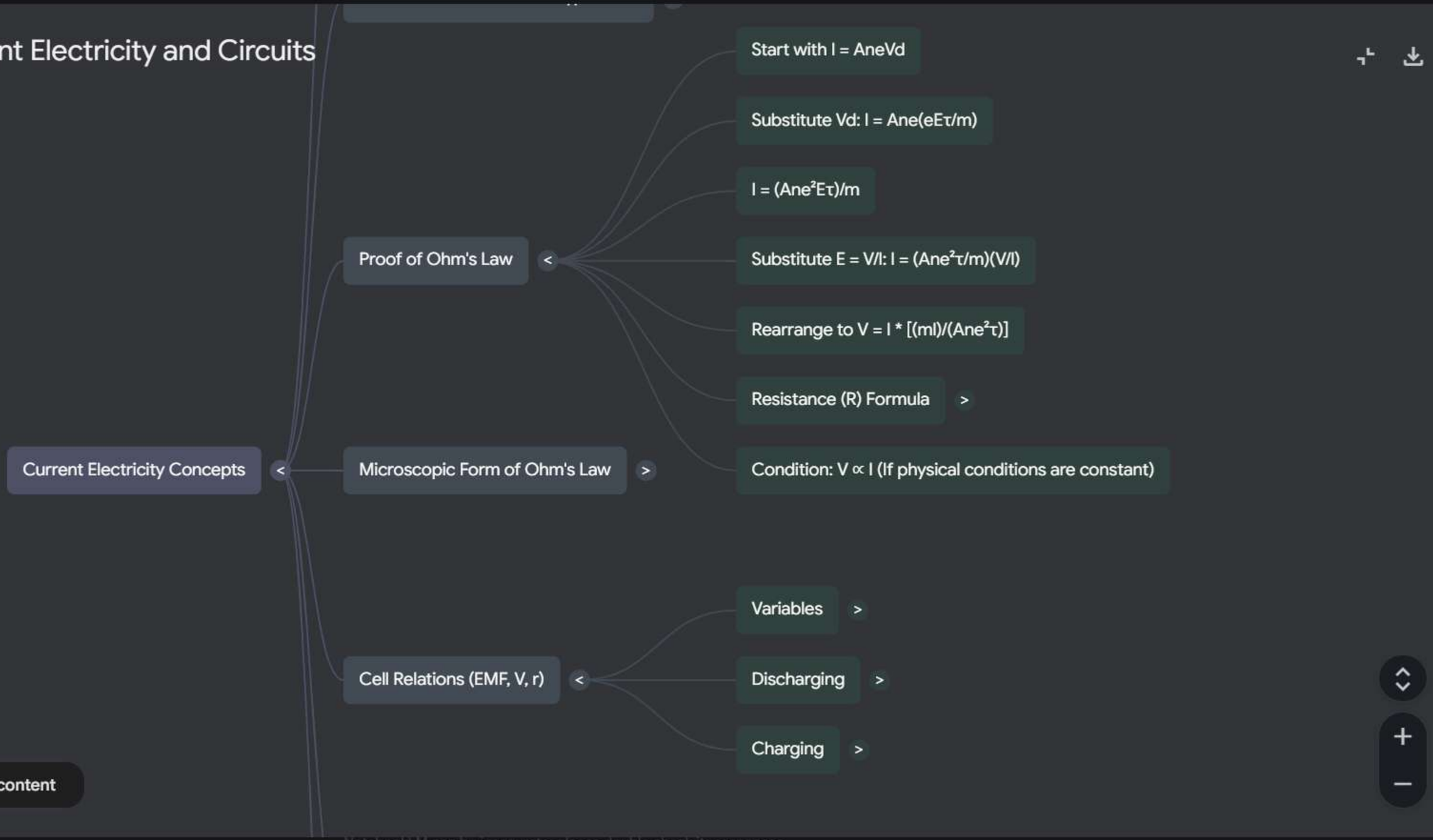

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In the absence of a battery, what is the average initial velocity of electrons in a conductor?

See answer

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What formula gives the acceleration 'a' of an electron in an electric field 'E'?

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What is the term for the time gap between two successive collisions of an electron with ions in a conductor?

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This time gap is called the relaxation time, denoted by τ.

Explain

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