GIRDHAR KUMAR

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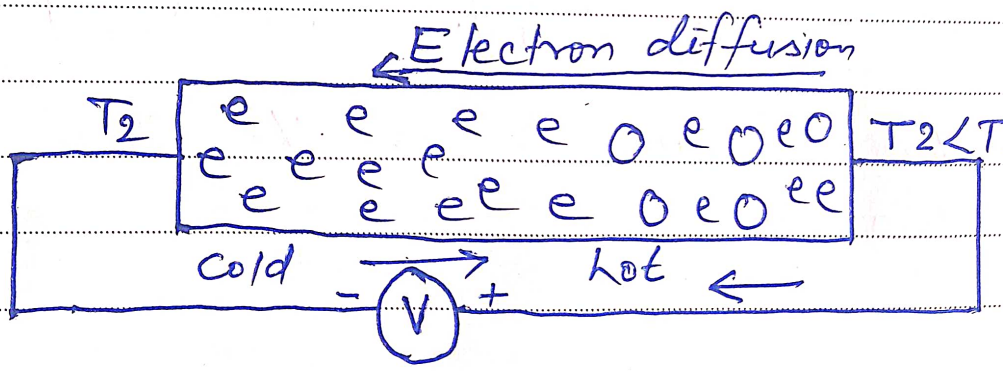
B. Sc. Part-II Sub, 09/02/2024, Physics notes. (P-1)
Paper-II, Group-B. (Current Electricity, Modern Physics)

Topic :— Thermodynamic treatment of Seebeck.

When two ends of a conductor are held at different temperatures electrons at the hot junction at heigher thermal velocities diffuse to the cold junction. Seebeck discovered that making one end of a metal bar hotter or colder than the other produced an EMF between the two ends.



He thought that he had discovered a way to tranform thermal energy into a magnetic field.

The magnitude of the emf V produced between the two junctions

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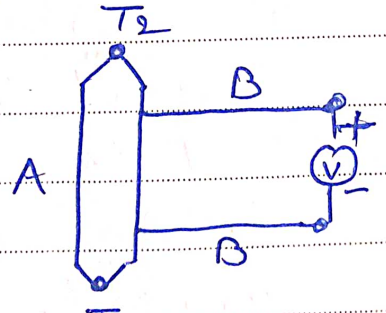
depends on the material and on ~~the~~ the temperature ΔT_{12} through the linear relationship defining the Seebeck coefficient S for the material.

$$\boxed{\Delta V = S \Delta T_{12}}$$

$\Rightarrow$ The Seebeck coefficient can be measured by connecting wire-A in a circuit with 2 wire-Bs. The two junction ends of wire-A are held at two temperatures, and V measured as T1 or T2 is varied, Diagram of.



only terminals 1 and 2 need be considered if the B-leads at the voltmeter are kept at the same temp. if T1 > T2 electrons flow to T1 leaving T2 more positive.