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4) In type-1 semiconductors, ~~semiconductivity~~, critical temp is low, low critical magnetic field, perfectly obey the Meissner effect and exhibits single critical magnetic field.

In type-2 semiconductors, critical temperature is high, High critical magnetic field, partly obey the Meissner effect and exhibits two critical magnetic field.

5) Important applications of superconductivity are dominated by the use of LTS materials and include:

- Magnets for Magnetic Resonance Imaging.
- Low and high field for NMR
- Accelerators for high energy physics
- Industrial magnets for magnetic separation.

on simplifying eq^n (3), we get

$$\boxed{\mu = \sigma R_H}$$

2) Superconductivity is a set of physical properties observed in certain materials where electrical resistance vanishes and magnetic flux fields are expelled from the material

Critical temperature of a substance is the temperature at and above which vapor of the substance cannot be liquified, no matter how much pressure is applied. Every substance has a critical temp.

The critical pressure of a substance is the pressure required to liquify a gas at its critical temperature.

3) The meissner effect is the expulsion of a magnetic field from a superconductor during its transition to the superconducting state when it is cooled below the critical temperature.

A superconductor with little or no magnetic field within it is said to be in the Meissner state. The Meissner state breaks down when the applied magnetic field is too strong.

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PHYSICS ASSIGNMENT ON

SOLID STATE PHYSICS

1) Hall Effect is defined as the difference in voltage generated across a current-carrying conductor, is traverse to an electrical current in the conductor and an applied magnetic field perpendicular to the current.

derivation

we all know that,

$$R_H = \frac{\sigma_h^2 R_h + \sigma_e^2 R_e}{(\sigma_h + \sigma_e)^2} \quad — ①$$

where,

σ_h → conductivity of holes
σ_e → conductivity of electrons
R_h → hall coefficient for holes
R_e → hall coefficient for electrons
R_H → Hall Coefficient

now, mobility, $\mu = \left|\frac{q\tau}{m}\right| \quad — ②$

then, $\sigma = \mu_e |q_e| n_e + \mu_h |q_h| n_h$

so, $$R_H = \frac{1}{|q|} \frac{n_h \mu_h^2 - n_e \mu_e^2}{(n_h \mu_h + n_e \mu_e)^2} \quad — ③$$

Teacher's Signature........................