

Electrical properties of solids

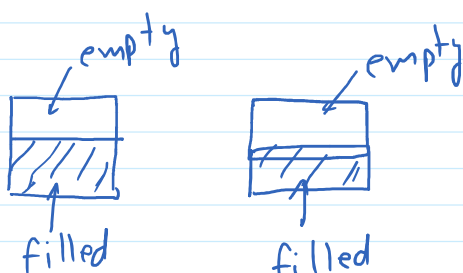
Solids can be classified into three types on the basis of their conductivities:

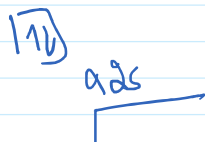
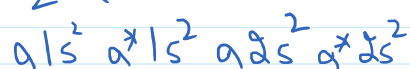
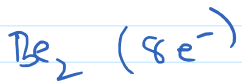
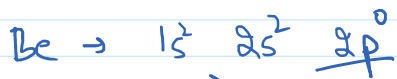
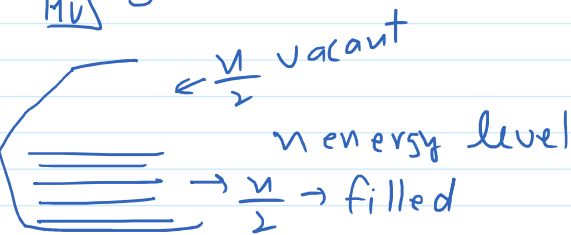
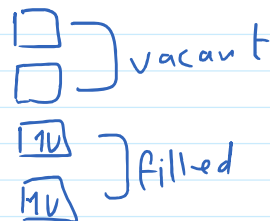
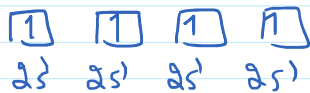
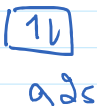
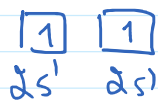
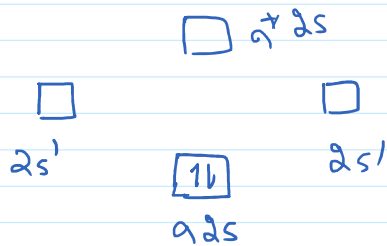
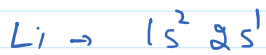
Solid type	Conductivity range (ohm ⁻¹ m ⁻¹)
Conductors	10^4 to 10^7 (high)
Insulators	10^{-20} to 10^{-10} (low)
Semiconductors	10^{-6} to 10^4 (intermediate)

Conduction of Electricity in conductors (Metals)

Electrolytic conductors conduct electricity through movement of ions. Metals conduct electricity in solid as well as molten state due to movement of electrons. The conductivity of metals depend upon the number of valence electrons available per atom.

The atomic orbitals of metal atoms form molecular orbitals which are so close in energy to each other as to form a band. If this band is partially filled or it overlaps with a higher energy unoccupied conduction band, then electrons can flow easily under an applied electric field and the metal shows conductivity.





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