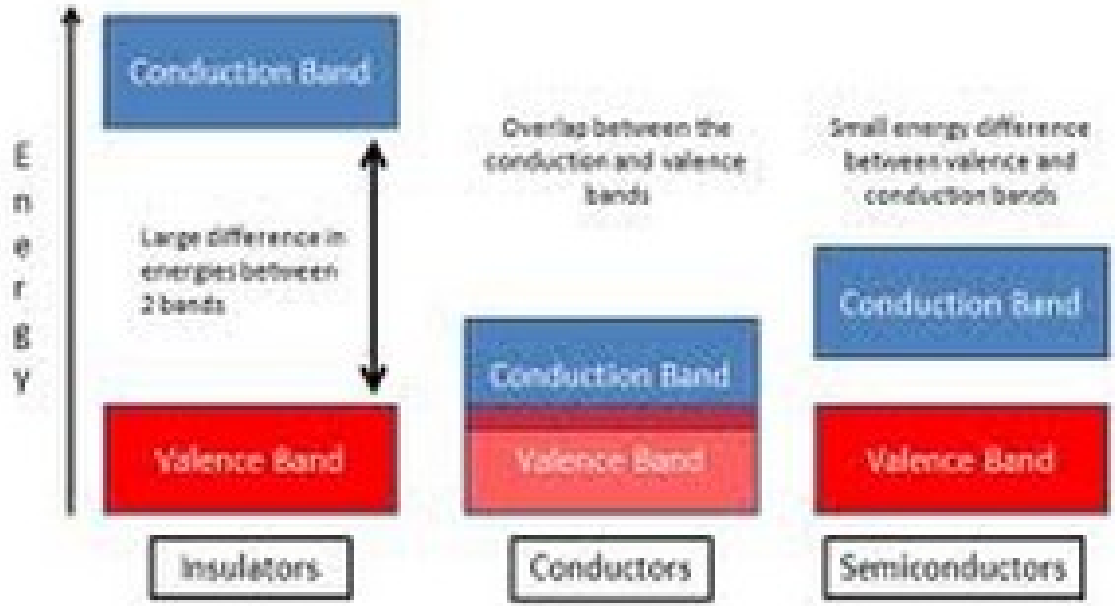

ELECTRONICS DEVICES AND CIRCUITS

OBJECTIVE

ELECTRICAL CONDUCTIVITY OF METALS, SEMICONDUCTORS AND INSULATORS.

ENERGY BAND DIAGRAM



- **Energy Band Diagram :-**
- The range of energies that an electron may possess in an atom is known as the energy band.
- Valence Band
- Conduction Band
- Forbidden Band

- **Conductors :-**

- The materials in which conduction and valence bands overlap as shown in figure are called conductors.

- → The overlapping indicates a large number of electrons available for conduction.
- → Hence the application of a small amount of voltage results a large amount of current.

Semiconductors :

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→ The materials, in which the conduction and valence bands are separated by a small energy gap (<3eV) are called semiconductors.

→ Silicon and germanium are the commonly used semiconductors.

→ A small energy gap means that a small amount of energy is required to free the elctrons by moving them from the valence band in to the conduction band.

→ The semiconductors behave like insulators at 0^0K, because no electrons are available in the conduction band.

→ If the temperature is further increased, more valence elctronics will acquire energy to jump into the conduction band.