# Electronics
# Lecture 1

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## History of Electronics:

In the present century we are dealing with electronic circuits and devices in some of the other form like computer, television, mobile etc. At present without electronics it is really impossible to work.

History of electronics began with the invention of $vacuum\ diode$ by *J A Fleming* in 1897 and after that a $vacuum\ triode$ was developed by *Lee De Forest* to amplify an electrical signal. This lead to the $tetrode$ and $pentode$ tubes that dominated the era of world war II.


Fig 1

After that transistor era began with junction $Transistor$ in 1948 Even though this particular invention got Nobel prize by *Wlliam Bradford, Skockley, John Bardeen and Walter* in 1956 . The use of Germanium and Silicon semiconductor materials made these transistors gains popularity and wide-accepted usages in different electronic circuit. The subsequent years witnessed of invention of $Integrated\ Circuit\ (IC)$ that drastically changed the nature of electronic circuit, which cause low cost, small size and weight. After that introduction of $JFET, MOSFET$ improves the process of designed making more powerful and reliable transistor.

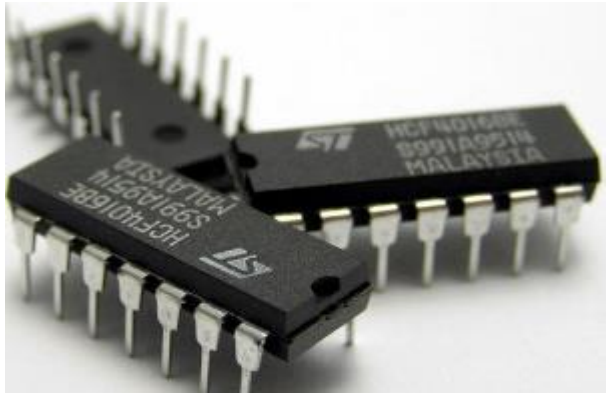


Fig 2

From the year 1958 to 1975 marked the introduction of IC with enlarged capabilities with several thousand components in a single chip such as small scale integration, medium scale integration and very large scale integration IC. Digital integrated circuit yet anther robust the development of IC that overall structure of computer. These IC are developed with Transistor-Transistor Logic(TTL), Integrated Injection Logic(I2L), Emitter Coupled Logic(ECL) etc. All these radical changes in all these components lead to the introduction of Microprocessor in 1969. Soon after Analog Integrated Circuits were developed that introduced the Operational Amplifier(OAPM) for analog signal processing.

This is all about the fundamental understanding of electronics history.

**Semiconductor:**

Semiconductor are the materials whose conductivity property lie between conductor and insulator.

Germanium, Silicon, Gallium, Arsenide etc. are best example of semiconductor.

The atomic Number of Silicon is 14 and of Germanium is 32,

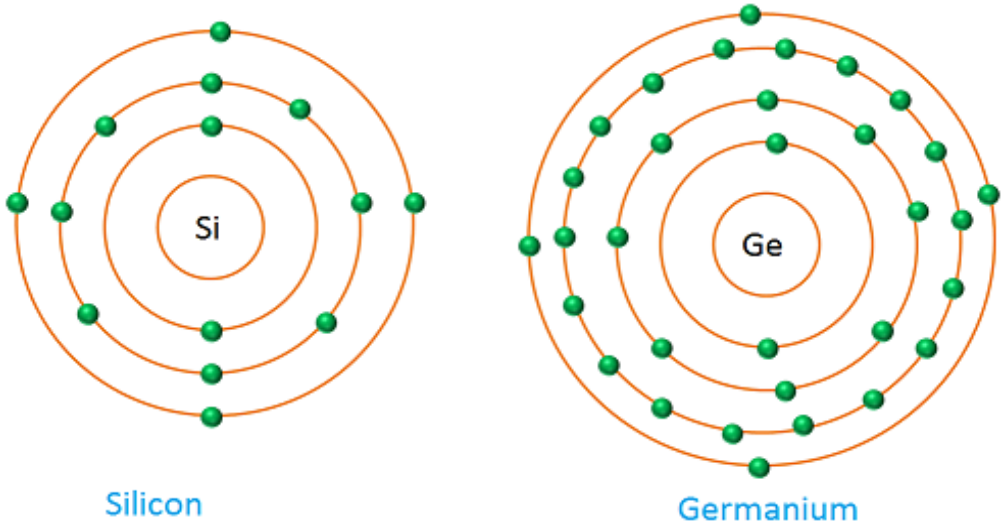


Fig 3

Let us take the case of Germanium.

In case of Germanium (Ge) the atomic number is 32. There are four valance electron in the outer orbit.

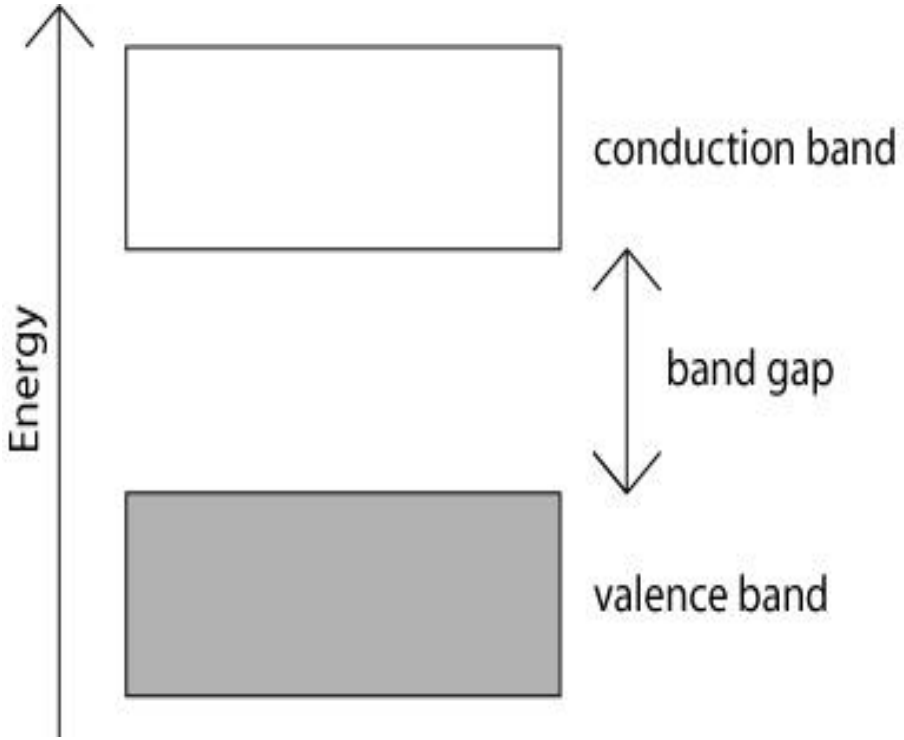


Fig 4

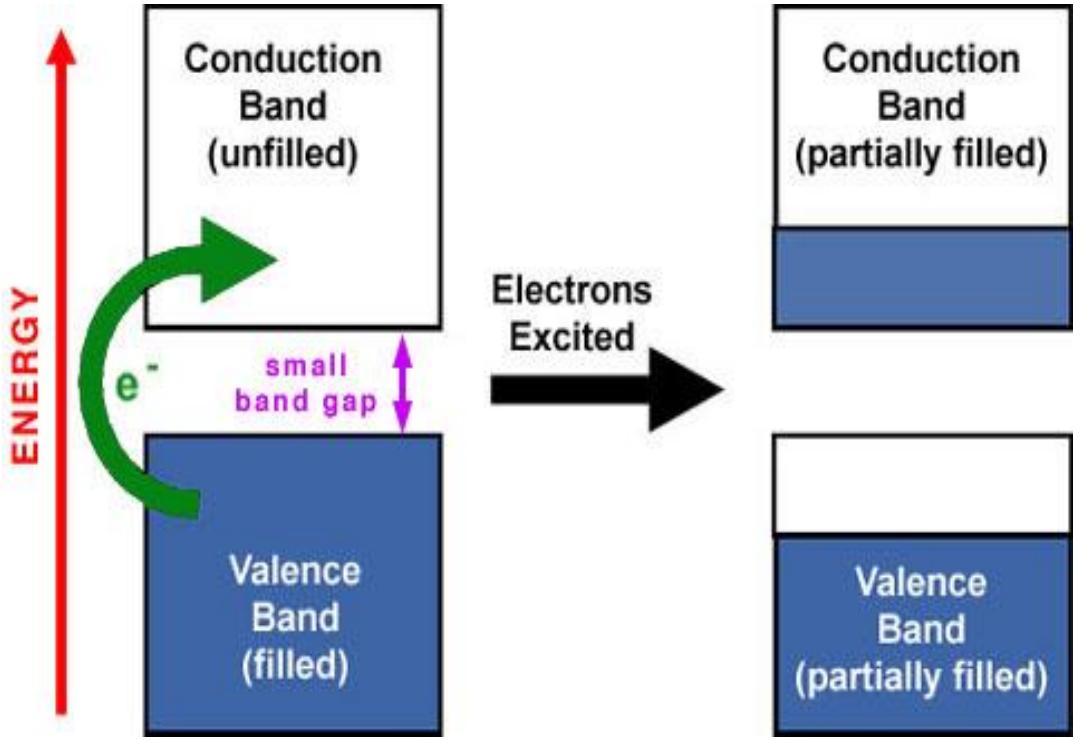


Fig 5

When it is excited the electrons goes to the conduction band and the electrons are known as Free Electron.

The vacant spaces are created in the valance band and these are known as Hole.

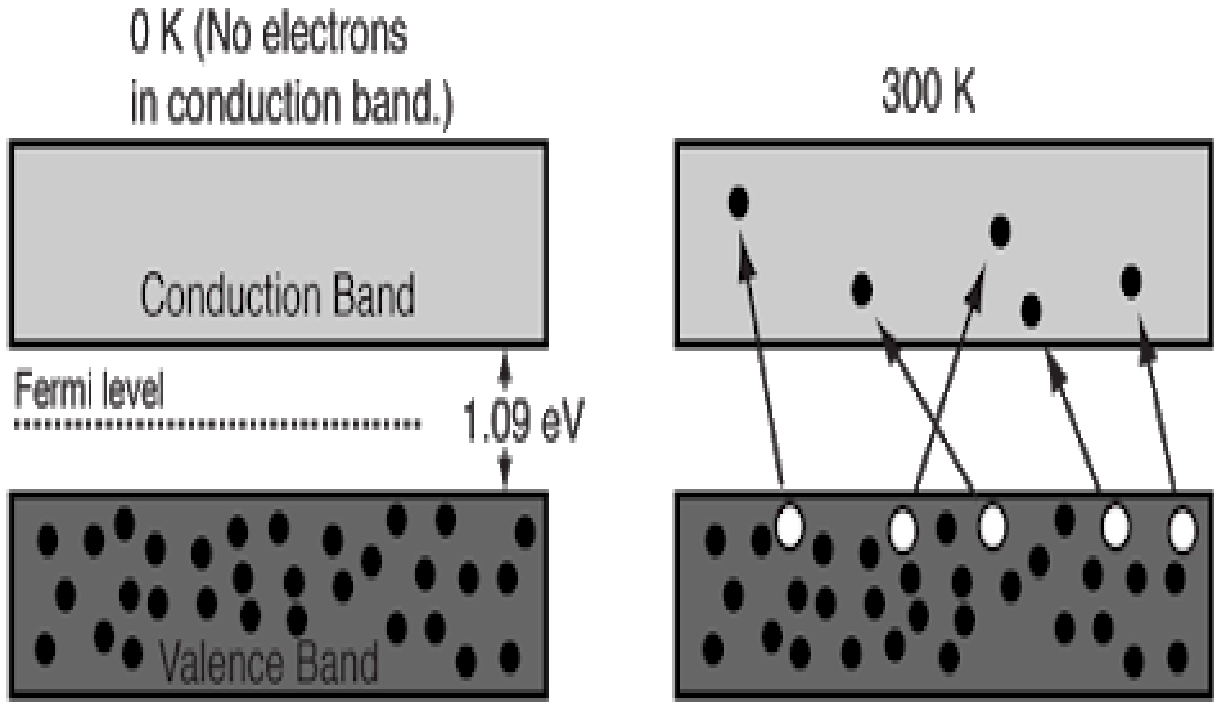


Fig 6