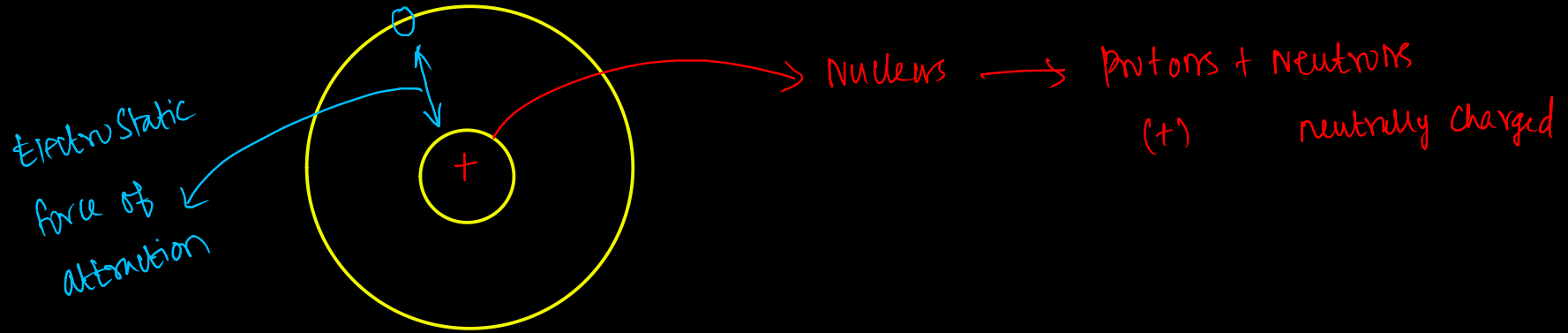


Basic Semiconductor Theory

Atom → Atomic number
→ Atomic weight



Electrons has negatively charged particles of $-1.602 \times 10^{-19} \text{ C}$, similarly protons have the same amount of charge as like that e^- but in opposite sign $+1.602 \times 10^{-19} \text{ C}$.
So that each and every atom is electrically neutral.

Generally the atomic number represents the n.o of protons in an atom, similarly the atomic weight of an atom is equal to sum of n.o of protons & n.o of neutrons.

Eg:- Si & He

Si \rightarrow atomic number \rightarrow 14

atomic weight $\rightarrow 14 + 14 = 28$

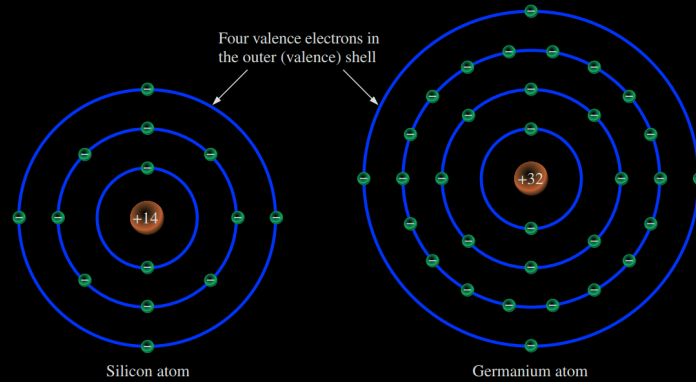
Note:- If an atom loss/gain an electron then it becomes an ion

If loss of an e^- means that becomes positive ion

If gain of an e^- means that becomes negative ion

Always the nucleus mass is about 1800 times of the electron mass in an atom

Electron orbits



In each shell the amount of electrons to be filled by $2n^2$ ($n \rightarrow$ shell number)

E_n level \rightarrow the amount of eV required to remove the valence electron from the outermost / valence shell. called E_n level. (eV)

Energy Level

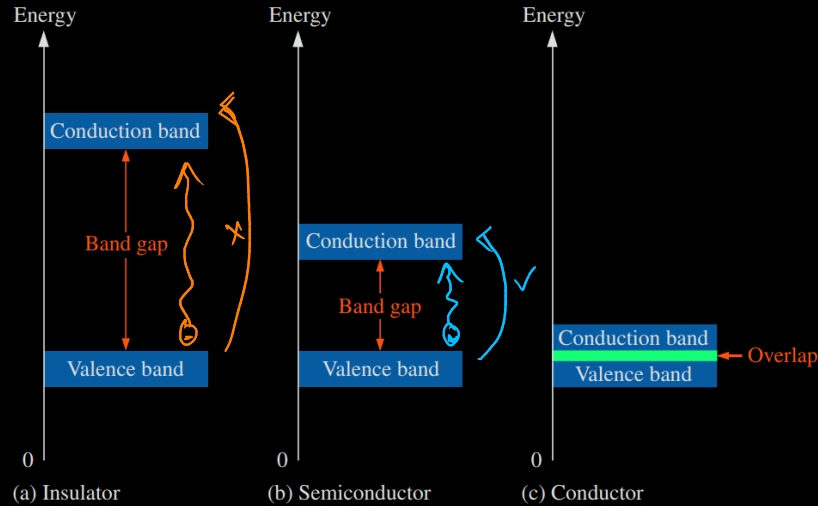
Bandgap / förbjuden \overline{en} gap

$$E_g = E_V - E_C$$

$$W = Q \times V$$

$$= 1.602 \times 10^{-19} \text{ C} \times 1 \text{ V}$$

$$W = 1.602 \times 10^{-19} \text{ J} \approx 1 \text{ eV}$$



$$E_g > 5 \text{ eV}$$

$$\text{Si} - 1.1 \text{ eV}$$

$$\text{Ge} - 0.6 \text{ eV}$$

Al, Fe

$$E_g \ll E_{Se} \ll E_{gin}$$