Do You Know?

(1) Electronics can be divided in two categories

(i) Valve electronics

(ii) Semiconductor electronics

(2) Free electron in metal experiences a barrier on surface due to attractive Colombian force.

(3) When kinetic energy of electron becomes greater than barrier potential energy (or binding energy E_b) then electron can come out of the surface of metal.

(4) Fermi energy (E_f)

Is the maximum possible energy possessed by free electron in metal at 0Ktemperature

(i) In this energy level, probability of finding electron is 50%.

(ii) This is a reference level and it is different for different metals.

(5) Threshold energy (or work function W_0)

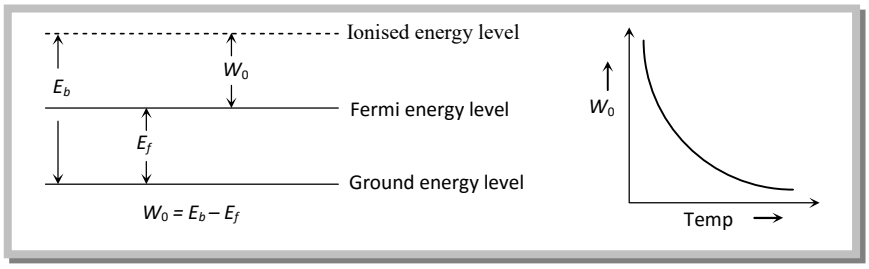
Is the minimum energy required to take out an electron from the surface of metal. Also $W_0 = E_b - E_f$

Work function for different materials

$(W_0)_{\text{Pure tungsten}} = 4.5$ eV

$(W_0)_{\text{Throated tungsten}} = 2.6$ eV

$(W_0)_{\text{Oxide coated tungsten}} = 1$ eV



(6) Electron emission

Four process of electron emission from a metal are

(i) Thermionic emission

(ii) (ii) Photoelectric emission

(iii) (iii) Field emission (

(iv) iv) Secondary emission.